TECHNOLOGY DEPT.

APRIL, 1952

Telephone and Management Engineer

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THE NATIONAL TELEPHONE MAGAZINE

Featuring In This Issue—

- New Construction Methods, *by John S. Reed*
- Clearing The Right of Way, *by John G. Reynolds*
- "Memo To A Lady At A Switchboard", *by Henry G. Turner*
- New Ideas In Drop Wire, *by Richard Allen*

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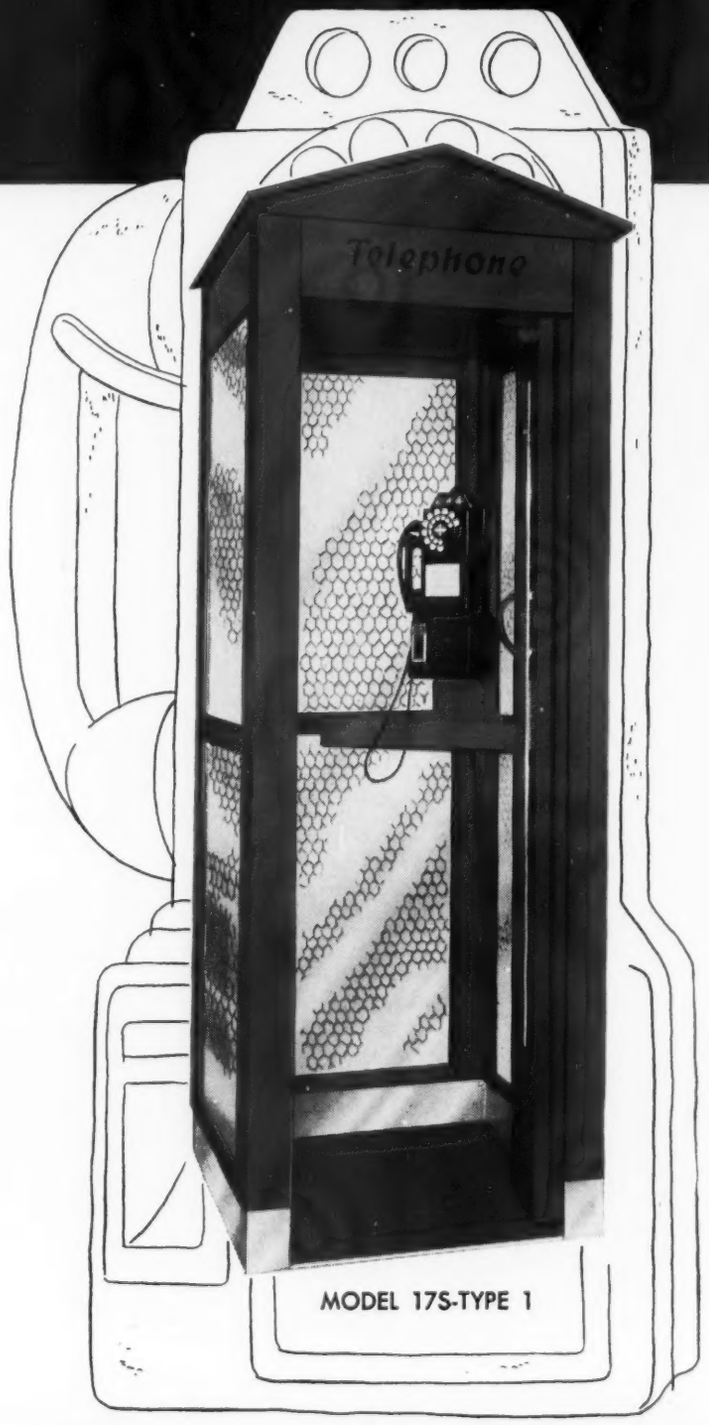

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Well-placed outdoor paystations—housed in attractive Sherron steel outdoor booths—are fertile fields for continuous, extra revenue. Scores of telephone companies are already cashing in on this discovery. It's no mystery why. Day in, day out . . . daytime, nighttime . . . week-ends, holidays . . . there's never any time out for the Sherron-housed paystations that are accessible at all times. Look into the locations in your area that offer the most likely paystation payoff . . . drive-in restaurants, roadside inns, service stations, just to name a few more obvious ones . . . Then install Sherron outdoor booths —the ultimate in telephone booth serviceability. Constructed of steel and wireglass, the Sherron outdoor booth offers full visibility, inside and outside, on all four sides. It is weatherproof . . . fireproof . . . termiteproof—and it won't rot or decay. Write for the full story.

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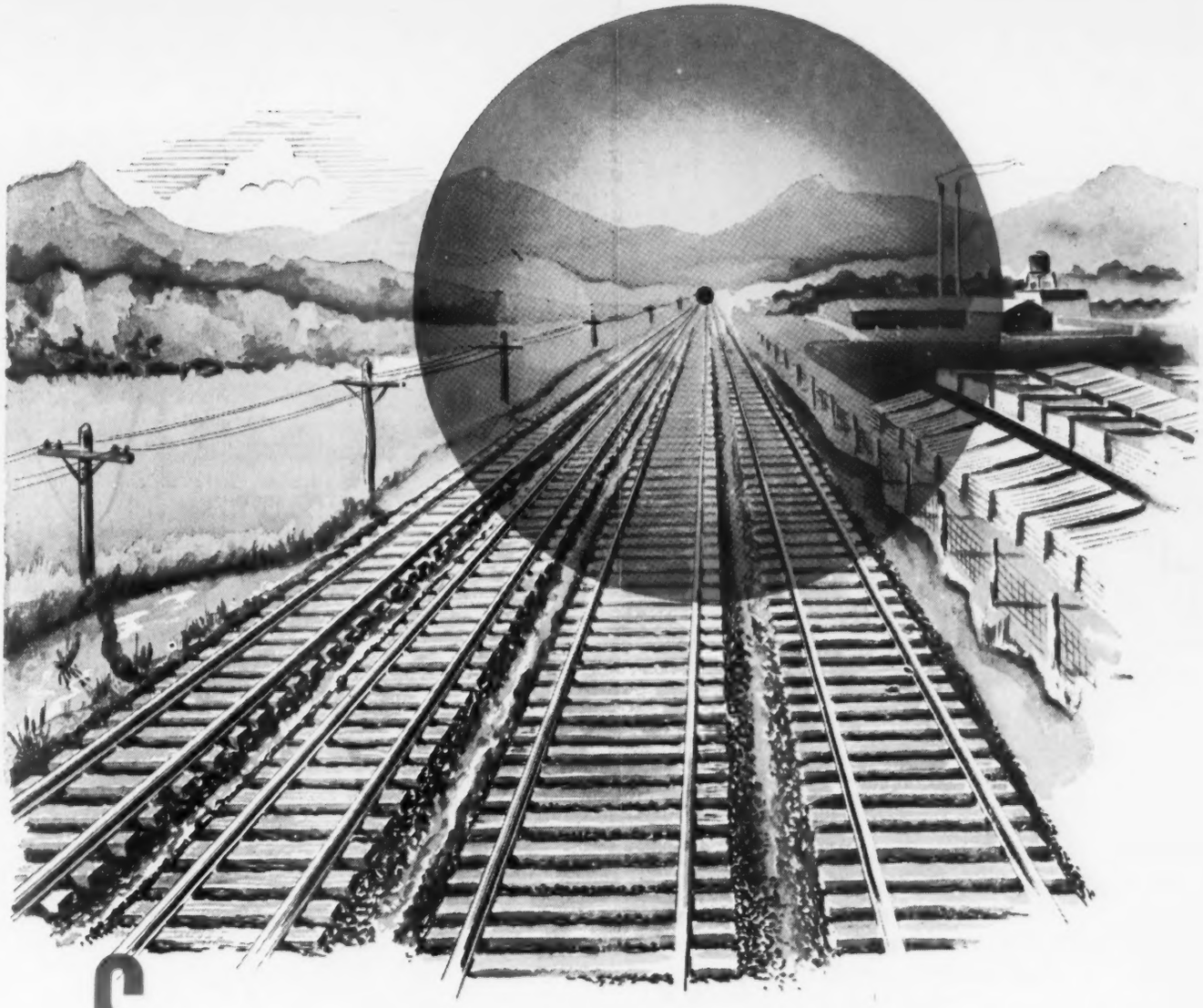

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Across The Editor's Desk

Within space of 43 hours death claimed two key members of the Lincoln (Neb.) Tel. & Tel. Co.'s official family: HILAND H. WHEELER, vice president, suffered a fatal heart attack Mar. 30, and FRANK H. WOODS died of a heart attack April 1 . . . The Independent industry will miss Mr. Woods and Mr. Wheeler and long remember them as outstanding telephone men.

• • •

Thanks to J. HARTWELL JONES of the Peninsular Telephone Co., Tampa, Fla., for sending us a copy of "A Requirement For Progress". The 8-page booklet which was recently mailed to Peninsular subscribers explains the company's need for increased rates in a manner that might well be used by many other companies . . . Our congratulations to Peninsular company for a fine piece of work!

• • •

Pennsylvania Independent Telephone Association will hold its 50th Anniversary Convention April 28-30 at Bedford Springs Hotel, Bedford, Pa. . . . Our heartiest congratulations to members of this fine telephone group and we hope to be on hand for a piece of the birthday cake.

• • •

Due to lack of space, our schedule of Coming Conventions isn't appearing elsewhere in this issue, but here is a run-down of the conventions coming up in April and May: Illinois Telephone Association, Hotel Abraham Lincoln, Springfield, Apr. 17-18; Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, Apr. 21-22-23; Pennsylvania Independent Telephone Association, Bedford Springs Hotel, Bedford, Apr. 28-29-30; United States Independent Telephone Association, Executives' Conference, Broadmoor Hotel, Colorado Springs, Colo., May 8-9; Wisconsin State Telephone Association, Park Hotel, Madison, May 14-15; Kansas-Missouri Telephone Associations, Town House, Kansas City, Kans., May 19-20-21; New York State Telephone Association, Mark Twain Hotel, Elmira, May 21-22.

The National Telephone Magazine

Telephone Engineer and Management

APRIL, 1952 VOL. 56, NUMBER 4

Editor, RAY W. SMITH • *Advertising Director,* ROY F. SMITH
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Advertising Manager, DON C. SORENSEN
Washington Bureau, ROLAND C. DAVIES *and* FRED HENCK
Circulation Manager, VIOLET ALTMEYER

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FRONT COVER

Simulating actual job conditions is an important factor in training. Here is a view of the east-side branch of the Ohio Bell Northeastern Area plant training school where men are learning various phases of cable work. In the large gym-like room, poles seem to grow out of the floor and here students learn to climb and to work on aerial cable from the platform.

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Main telephone building Carlisle Exchange.

Exide-Manchex 11-FME-17 Battery in Carlisle Exchange of United Telephone Company of Pennsylvania.

Exide-Manchex BATTERIES

ASSURE DEPENDABLE POWER FOR CARLISLE EXCHANGE

It's a progressive exchange in a progressive city... a fast-growing city. For among Pennsylvania's 50 largest cities, Carlisle ranks sixth in population growth during the ten years ending with 1950.

Rapid as this growth has been, the Carlisle Exchange has kept pace with the city's telephone needs. It serves approximately 8,000 subscribers, has a 23-position switchboard, and handles close to 40,000 calls per day. Standby power is provided by Exide-Manchex, the battery that assures:

POSITIVE OPERATION: dependable performance for all telephone battery requirements—central office and private branch exchange equipment.

ADEQUATE RESERVE POWER for emergencies beyond normal needs.

LOW OPERATING COST: extremely low internal resistance.

LOW MAINTENANCE COSTS: water required about twice a year. No change of chemical solution during life of battery.

LOW DEPRECIATION: sturdy, long-life construction which includes the exclusive manchester positive plate.

GREATER CAPACITY in a given amount of space avoids overcrowding of equipment.

These and other features combine to make Exide-Manchex *your best battery buy . . . AT ANY PRICE.*

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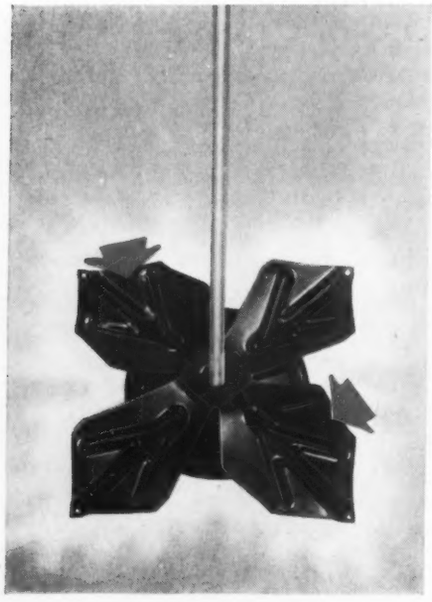
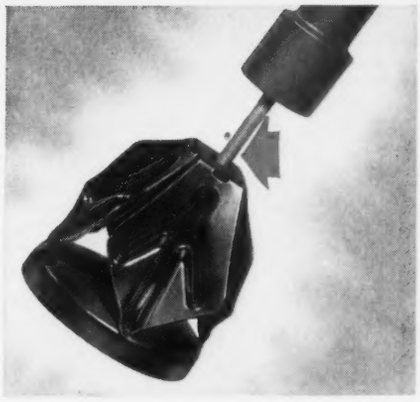
1888 . . . DEPENDABLE BATTERIES FOR 64 YEARS . . . 1952

Two-piece design . . . The four blades are formed of a single piece of steel, and are held to the base plate by four small bolts, which simply shear off by tamping. The center hole is extruded downwards. This extrusion provides a bearing surface against the rod to prevent binding; it reinforces the tamping area; and it provides an audible signal when the extrusion strikes the base, indicating full expansion.



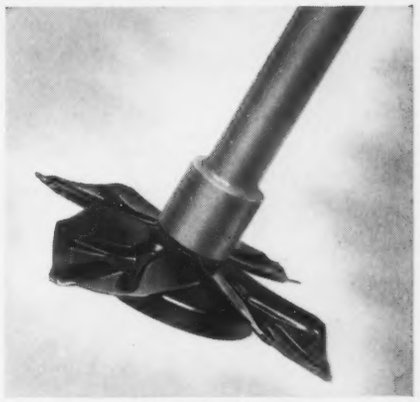
Top view . . . Notice the additional area inside the center of gravity of two opposed blades which gives utmost area for increased holding power, without sacrificing balance of the anchor.

Base plate . . . .Heavy steel, with skirted edge to prevent deformation. A nut retainer strap welded to the underside reinforces the hole so that the nut cannot pull through the base plate.



Anchor closed . . . Notice the large square tamping area, and the wide hinge sections which keep the blades from twisting if a stone is encountered while the anchor is being expanded.

Partly open . . . Arched, shovel-shaped blades slide into the earth with a minimum of soil disturbance. Heavy ribs on the underside decrease friction between blades and base plate.



Fully expanded . . . A large percentage of the expanded area is in undisturbed earth. Therefore load can be applied to the anchor immediately after installation, with little danger of creepage.

L-M's New 4-Way Pressed Steel Anchors Designed for Exceptional Strength

L-M has recently completed an extensive series of tests that reveal exceptional strength and holding power in the new 4-Way anchors.

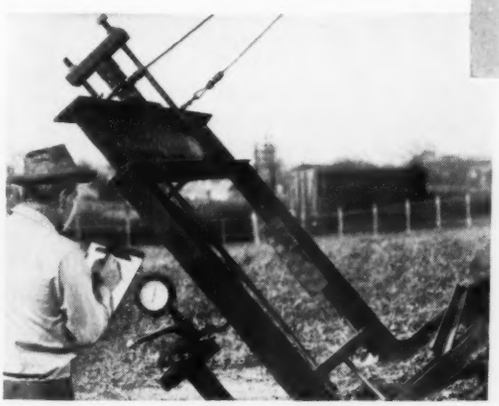
These anchors are easy to install. They have ample holding power above their nominal ratings. There is a generous safety factor in mechanical strength of all parts. And the cost is low!

The design offers many desirable features. A large square tamping area is well reinforced by the downward extrusion of the anchor rod hole, which also provides a bearing area against the rod. Arched, pointed blades slide into the earth without disturbing it, permitting application of the load right after installation. Heavy ribs reinforce the blades and reduce friction against the base plate during expansion. Nut retainer strap reinforces the base, and keeps the nut from pulling through. All three sizes are REA-accepted.

For information ask your Kellogg man; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Available in Three Sizes

Catalog No.	200026B1	200026B2	200026B3
Expanded Area, square inches	110	125	132
Nominal Holding Power Class, pounds	6000	8000	10,000
Diameter, closed, inches	8	8	8
Anchor Rod Diameter, inches	⅝, ¾	⅝, ¾	1
Minimum Strength of anchor without deformation, pounds	16,000	21,000	24,000



Hydraulic lift mounted on U-shaped steel frame with pump and pressure gauge for recording the pounds of pull applied to anchor rod. Tests at vertical and 45° angle showed ample mechanical strength of all parts, well balanced against holding power.

81-R

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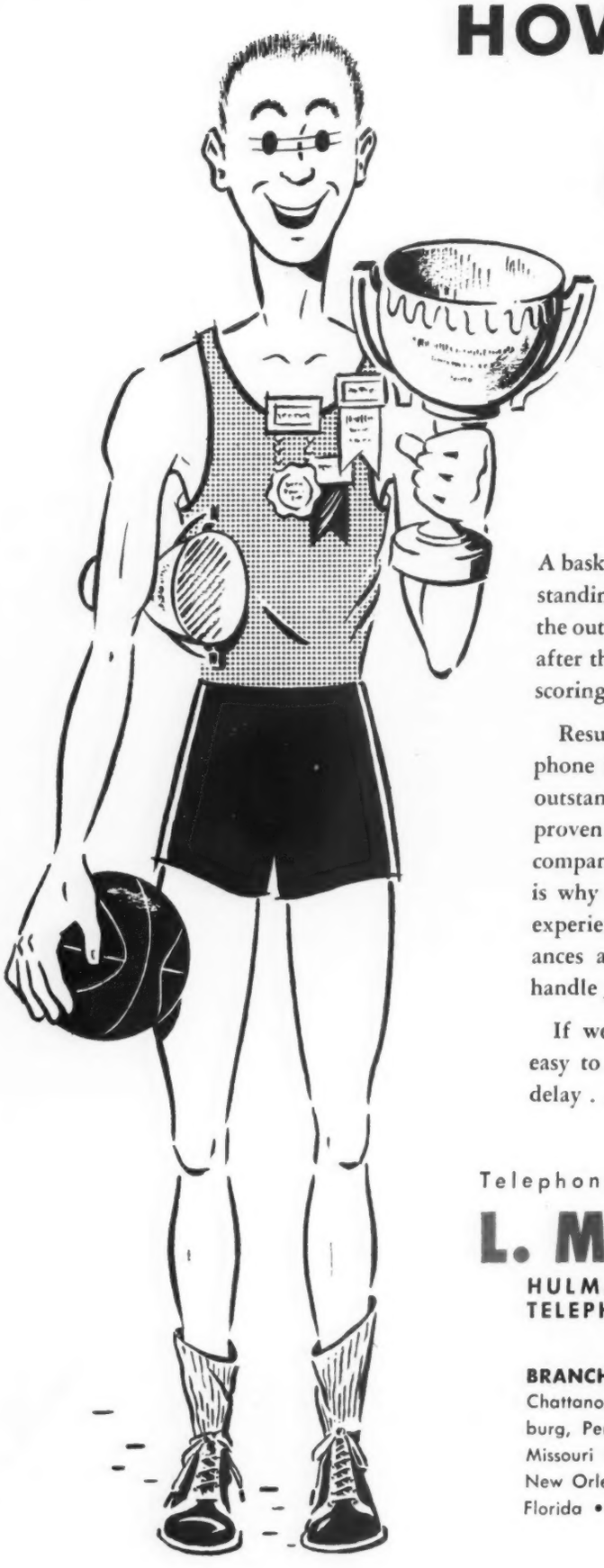

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NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND *Management*
ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH
NEWSLETTERS *on Alternate Weeks*

April 15, 1952

Dear Sir:

Declaring that detailed reasons for its action will be set forth in order, Chairman Reford Bond of Oklahoma Corporation Commission announced Mar. 24 that agency has denied application of Southwestern Bell Tel. Co. for $2,520,000 rate increase asked because of wage & tax increases.

Chairman Bond of the Oklahoma commission said that "the testimony and the law of the case were insufficient to grant the increase." He said company will have right of appeal, & that order will not be effective until written order is prepared. Commission granted company's application to establish metropolitan extended area plan for Oklahoma City.

In other Bell System rate developments, proposed rates of New England Tel. & Tel. Co. were put in effect in New Hampshire under bond; Bell Tel. Co. of Nevada was turned down in court appeal; rate increases were approved for Illinois Bell Tel. Co. in portion of Indiana it serves; 10-cent coin box rates were instituted in Maryland & Virgina.

* * *

Tentative program for annual conference of State Utility Commission Engineers April 22-24, including several topics of prime importance to communications field, was announced Mar. 27 by National Association of Railroad & Utilities Commissioners (NARUC).

Program includes 2 topics with direct bearing on telephone field. William E. Roby, chief engineer of Indiana Public Service Commission, will discuss future of small telephone company, while Vern W. Chase, communications engineer of North Carolina Utilities Commission, will talk on "application of free inter-exchange service."

Another discussion of major significance to communications field is talk on "effect of restrictions on copper & aluminum on industry."

John P. Randolph, NARUC general solicitor, will give address of welcome, while Austin L. Roberts, Jr., NARUC general solicitor, will report on highlights of association activities. George Steinmetz, Wisconsin Public Service Commission chief engineer, will give report of NARUC Committee on Engineering.

Raleigh Hotel in Washington, D. C., will serve as headquarters. Edward C. O'Rear of Kentucky Public Service Commission is president of conference for current year.

* * *

Because telephone industry has not been able to restore margins depleted by World War II overload, industry would be severely handi-

capped in answering any sudden call for expanded service, members of Domestic Communications Operating Industry Advisory Committee told National Production Authority (NPA) officials at recent conference.

At industry advisory meeting on Mar. 26, members of committee declared that telephone companies are not only hard pressed to meet current defense needs with available materials, but systems are so overloaded that industry could not readily meet demands of general emergency with present facilities. They emphasized that because of lack of reserve central office facilities & unused circuits, industry finds it difficult to take care of unforeseen needs as well as normal growth.

During the meeting, committee members approved several proposed revisions of Order M-77, special order for communications industry, including one proposal which would increase limit for self-certification by small operators from $15,000 to $25,000 per project. Also provided under revisions would be inclusion of all building programs—order presently covers only buildings which house operating equipment—& applications for materials would be made on form, NPAF-117, authorized by M-77. Order would also spell out restrictions on use of controlled materials for certain purposes in construction, although this change would have no material effect because industry is already prohibiting use of copper for such things as flashing on voluntary basis. Still another amendment would cover international operations.

In acknowledging position of the industry, as expressed by members of Bell System & Independent telephone companies & Western Union Teleg. Co., NPA officials said that defense agencies are aware of industry's need for copper & other construction materials. They pointed out that wire communications industry will receive from 5.5 million to 7.5 million more pounds of copper during 3rd quarter of 1952 than it received for 2nd quarter.

* * *

Moving on side of Bell System companies & FCC Common Carrier Bureau, which have opposed Commission's decision to eliminate substantially all of campanies' tariff provisions relating to discontinuance of service for illegal use, California Attorney General has asked the FCC for permission to intervene & present further evidence in "Katz case," in which FCC upheld most of the complaints of Washington, D. C., couple against companies' tariffs. Effectiveness of Katz decision is now suspended, pending FCC action on petitions to reconsider its action.

Meanwhile, at request of California & with concurrence of Western Union Teleg. Co., FCC Examiner Fanney N. Litvin has postponed start of hearings on company's anti-gambling tariffs to May 1. Western Union agreed to extend effective date of suspended tariffs, which would limit to legitimate news agencies any private line service for transmission of racing information, for another month, until July 1.

Ray W. Smith Editor

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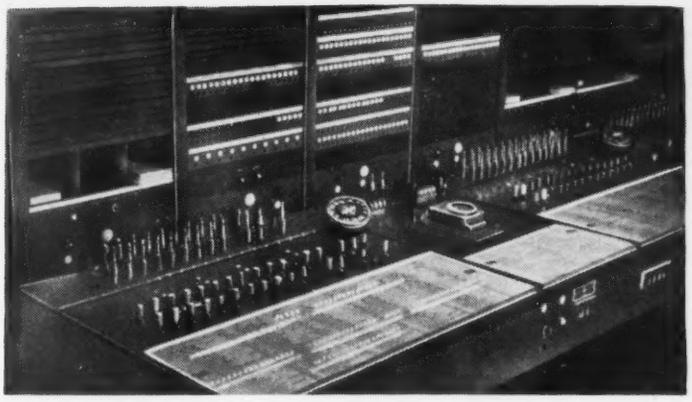

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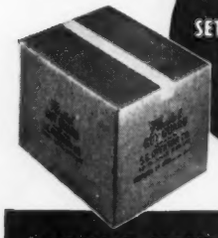


SEE YOUR JOBBER OR WRITE TO

S. E. OVERTON COMPANY

SOUTH HAVEN, MICHIGAN

Washington Bureau Reports

By ROLAND DAVIES and FRED HENCK

Copper allocation falls about nine million pounds short of telephone industry's requirements . . . House Appropriations Committee makes sure REA will have sufficient authority to cover all loans its staff will make.

ALTHOUGH the copper allocation of 53.7 million pounds for the communications industry for the third quarter is the highest quarterly allotment made since the controlled materials plan was begun a year ago, the industry is hardly "out of the woods" regarding critical metals, it is apparent from a comparison of the total allocations with the industry's stated requirements.

The amount granted falls about nine million pounds short of meeting the nation's communications companies' stated needs. The industry's total, however, already has been revised upward in a Defense Production Administration adjustment of the original allotments, and favorable action on an appeal by the National Production Authority's Communications Equipment Division will further narrow the gap between available copper and the amount required.

The copper allocation will mean a continued curtailment of essential services unless supplemental quantities of the material are granted by DPA as a result of the appeals now pending.

In previous quarters, since the controlled materials plan went into operation, the copper allocations have been as follows: 1951 third quarter, 51.7 million pounds; 1951 fourth quarter, 52.2 million; 1952 first quarter, 52.1 million; and 1951 second quarter, 47.1 million.

Illustrating the relaxing situation regarding the other two controlled materials, steel and aluminum, the communications industry received substantially all of its requirements for those metals for the third quarter. The totals were 40,500 tons of carbon steel; 1225 tons of alloy steel; and four million pounds of aluminum.

Earlier, the industry received a sharp disappointment, of the more than 20 million pounds of brass products which DPA had said would be available for supplemental allotments for the second quarter, only 521,000 pounds was made available for communications.

The small amount granted to the communications industry resulted because nearly all the copper was ticketed for brass mills and the DPA and the NPA Copper Division rejected proposals that some of it be rechanneled to wire mills, where it would have been of more use to the communications companies.

The serious position of the telephone industry has been emphasized by members of the Domestic Communications Operating Industry Advisory Committee to NPA at a conference with officials of the government agency.

At the industry advisory meeting, members of the committee declared that telephone companies are not only hard-pressed to meet current defense needs with available materials, but that systems are so overloaded that the industry could not readily meet the demands of a general emergency with present facilities. They emphasized that because of the lack of reserve central office facilities and unused circuits, the industry finds it difficult to take care of unforeseen needs as well as normal growth.

During the meeting, committee members approved several proposed revisions of NPA order M-77, the special order for the communications industry, including one proposal to increase the limit for self-certification by small operating companies from

Here's Proof of Performance

A MOVE, A FLOOD AND 37 YEARS OF SERVICE HAVEN'T AFFECTED THESE POLES —THEY'RE PROTECTED BY

CREOSOTE OIL

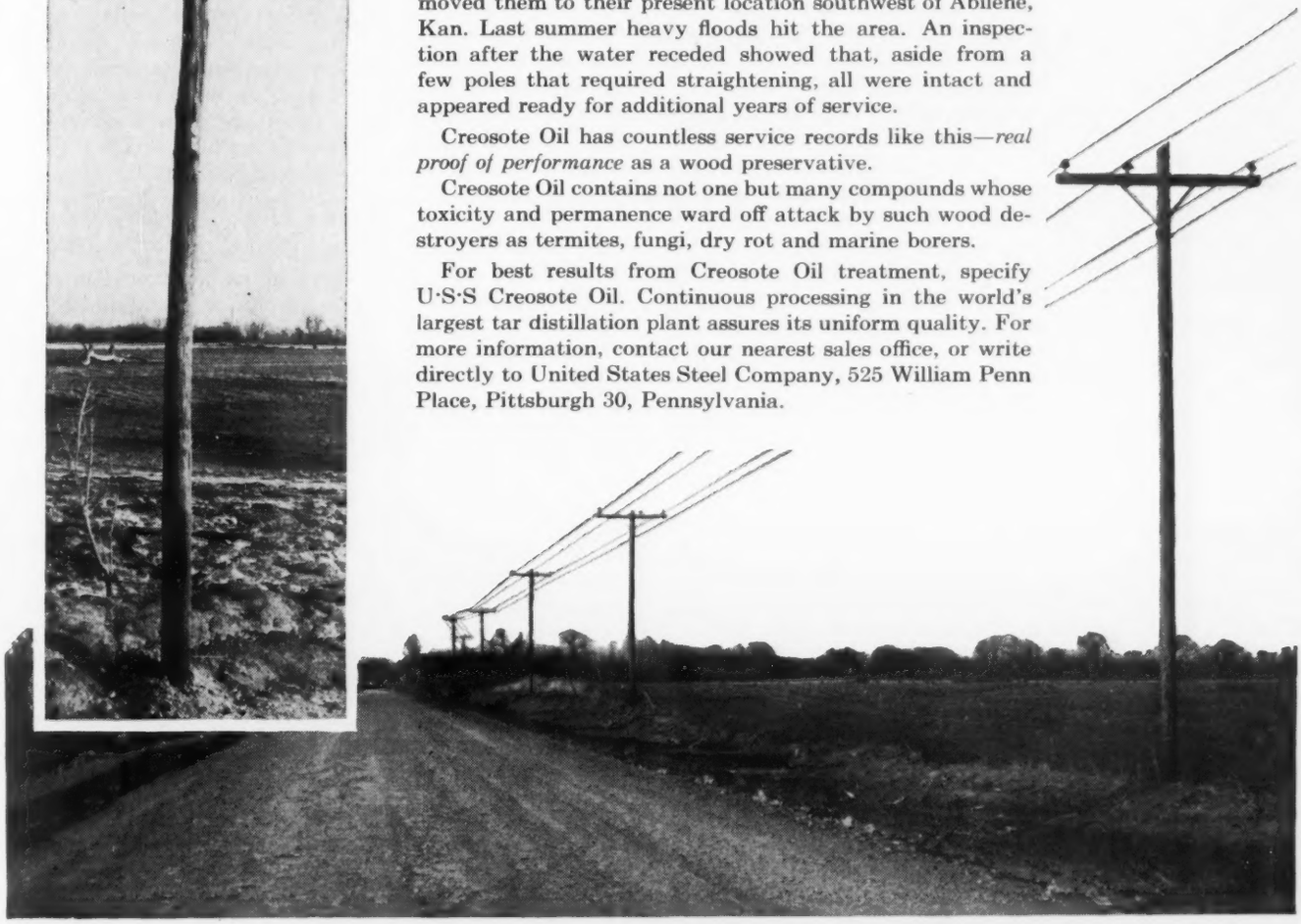
HERE'S ANOTHER EXAMPLE of the effectiveness of Creosote Oil as a wood preservative. In 1915 these southern pine poles were treated with Creosote Oil and installed near Gypsum, Kansas.

Fifteen years later, the owner, United Power & Light Corporation (now The Kansas Power and Light Company), moved them to their present location southwest of Abilene, Kan. Last summer heavy floods hit the area. An inspection after the water receded showed that, aside from a few poles that required straightening, all were intact and appeared ready for additional years of service.

Creosote Oil has countless service records like this—*real proof of performance* as a wood preservative.

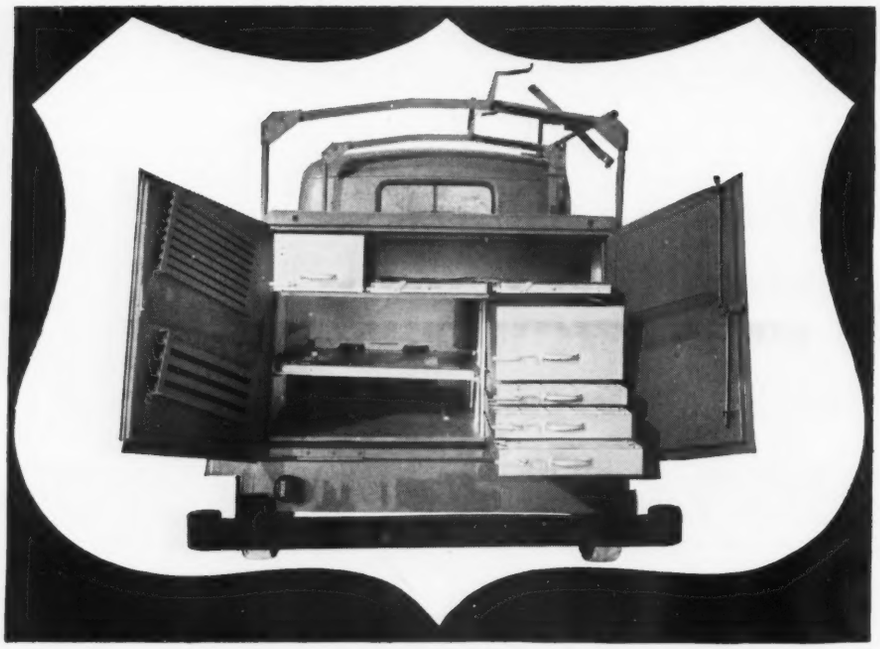
Creosote Oil contains not one but many compounds whose toxicity and permanence ward off attack by such wood destroyers as termites, fungi, dry rot and marine borers.

For best results from Creosote Oil treatment, specify U·S·S Creosote Oil. Continuous processing in the world's largest tar distillation plant assures its uniform quality. For more information, contact our nearest sales office, or write directly to United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pennsylvania.



U·S·S CREOSOTE OIL

UNITED STATES STEEL



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Installer's Unit
Compact arrangement-
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The rear and side doors open to place at the disposal of the installer all the materials and tools he desires—drop wire reel, ladders, tree trimming equipment, wire and cords, screws, clamps, fuses, and all the other things that he must have on the job to avoid an unnecessary trip back to the shop. The workmanship on this body equals its efficient arrangement.

It has the rugged built-in strength to give years of service in all weather, on all roads.

Send today for your complete Highway catalog of public utility equipment. Or, call or visit the friendly Highway Distributor or Factory Branch nearest you.

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Headquarters: Edgerton, Wisconsin

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The nation's largest Manufacturers of Utility Truck Bodies • Earth Boring Machines • Pole and Cable Reel Trailers • Winches • Power Take-offs • Service Accessories

$15,000 to $25,000 per project. Also provided under the revisions would be the inclusion of all building programs—the order currently covers only buildings which house operating equipment—and applications for materials would be made on form NPAF-117, outlined in the M-77 order. The order also would spell out restrictions on the use of controlled materials for certain purposes in construction, although this change would have no material effect because the industry already is prohibiting the use of copper for such purposes on a voluntary basis.

In acknowledging the position of the industry that it is far less able to cope with another emergency than it was before World War II, because of the demands placed on it by the government's mobilization program, NPA officials said that defense agencies are aware of the industry's need for copper and other materials.

Industry spokesmen reiterated that allocations of controlled materials to the communications industry since the controlled materials plan went into effect have been far short of meeting requirements, particularly as far as copper is concerned, and as a result there has been a continual curtailment of essential services, with held orders and requests for upgrading of service constantly on the increase.

The communications industry was urged, through its committee, to submit more specific information on individual company requirements for later quarters. Many companies, NPA officials said, fail to provide NPA with details on construction programs beyond the quarter covered by the controlled materials application form, and as a result NPA is handicapped in discussing quarterly materials requirements of the industry with Defense Production Administration officials.

"Clearcut Regulatory Jurisdiction . . ."

THE ADVANTAGES of clearcut regulatory jurisdiction—and the disadvantages when it is lacking—have been exemplified in a request to the Federal Communications Commission that it either dismiss a five-year-old proceeding on Washington, D. C., metropolitan area rates, or else take two Chesapeake & Potomac Telephone Cos. "off the hook" in filing monthly reports.

The two companies, serving Maryland and Virginia, urged that the FCC, if it cannot see its way clear to winding up the case, should at least relieve them of the necessity of submitting the monthly reports on cer-

We Ride Herd ON DIRECTORIES

● Want to round up straying advertisers? Want help in handling that growing pile of details? Want to clean up your directory generally? See an old hand at directory management who will show you a program of proven effectiveness for increasing revenue through directory advertising. You are invited to write or call Loomis today... without any obligation on your part.

KNOW-HOW TO SOLVE YOUR DIRECTORY PROBLEMS

"Where to Call"

● 724 cities and towns in 22 states are served by the 287 directories that retain Loomis services.

LOOMIS
ADVERTISING COMPANY

FT. WAYNE, IND.
Gettle Building . . . EAstbrook 3477

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RAYTHEON RECTICHARGERS®

(BATTERY CHARGERS)

The same Raytheon RectiChargeRs which are standard equipment throughout the Telephone Industry also provide unfailing current for safeguarding vaults There is no more convincing testimony to DEPENDABILITY than the application of this equipment to the Protective and Alarm Systems employed by Banks from coast to coast.

RAYTHEON

Excellence in Electronics

ADD UP THESE ASSETS — *Raytheon RectiChargeRs are fully automatic in operation . . . always follow the load . . . maintain constant voltage output over the complete load range . . . prolong battery life . . . prevent overcharging and undercharging . . . contain no moving parts to wear out . . . require no routine maintenance other than inspection only once or twice a year* — and you have the standard, time-tested battery charger of the constant potential type, the ideal equipment for year in, year out dependable Telephone service at low cost.

Complete line for all Telephone Needs

Catalog Number	Battery Cells	Amps. Cont.	Input Voltage	Control
RCR-1066B RCR-1058B RCR-1067B	11/12 11/12 11/12	1.0 3.0 6.0	115 Volts, 60 cycle, 1-phase	Magnetic
RCR-2013A RCR-2016A	11/12 11/12	12.0 24.0	115 or 230 volts, 50 or 60 cycles, 1-phase	Electronic
RCR-1068B RCR-1069D RCR-1070D	22/24 22/24 22/24	1.0 3.0 6.0	115 volts, 60 cycle, 1-phase	Magnetic
RCR-2016B	22/24	12.0	115 or 230 volts, 50 or 60 cycles 1-phase	Electronic
RCR-3525 RCR-3550 RCR-35100	22/24 22/24 22/24	25.0 50.0 100.0	208 or 220 volts, 50 or 60 cycles 3-phase	Magnetic Amplifier

RAYTHEON
MANUFACTURING COMPANY
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DISTRICT OFFICES: BOSTON, NEW YORK, CLEVELAND, CHICAGO, NEW ORLEANS, LOS ANGELES (WILMINGTON), SAN FRANCISCO, SEATTLE
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RAYTHEON PRODUCTS INCLUDE:
MARINERS PATHFINDER* radar; Submarine Signal FATHOMETERS*; Marine radiotelephones; WELDPOWER* welders; Voltage stabilizers (regulators); Transformers; RectiChargeR* battery chargers; RectiFilteR* battery eliminators; Sonic oscillators for laboratory research; Standard control knobs; Electronic calculators and computers; Television receivers, Radio, television, subminiature and special purpose tubes; MICROTHERM* diathermy and other electronic equipment. *Reg. U S. Pat. Off.

Your regular Supplier offers the complete line of Raytheon RECTICHARGERS for all Telephone requirements. Ask him for complete information, or write us direct.

tain interstate interzone charges collected on calls between points in Virginia and points in Maryland within the Washington metropolitan area.

The companies, pointing out that they are planning to introduce automatic message accounting equipment in the Washington metropolitan area, declared that "to provide the details necessary under the new system to identify the message unit calls involved in these proceedings will require substantial increased investment in the new equipment, with correspondingly higher annual expense."

Despite the extent of the records required, and the large cost necessary to continue them when an AMA system is introduced, the revenues involved in the case are small, averaging only about $845 a month for the Maryland company, it was pointed out. It was also noted that the number of message units applicable to "local area" service, involved in the FCC case, are identical with the units applicable to "extended area" service in the Washington metropolitan area, over which the FCC has never claimed jurisdiction.

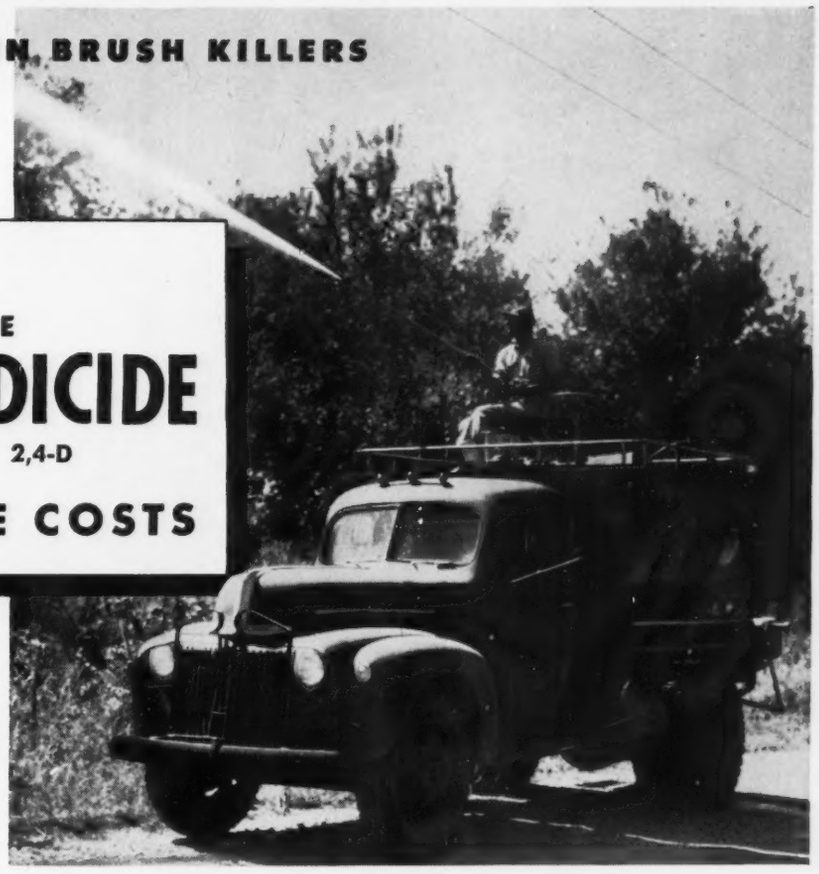
The case had its roots in 1937, when Washington metropolitan area service was established, and the FCC asserted jurisdiction over a part of the interstate exchange service involved. The C. & P. companies filed the necessary tariffs with the FCC, changing them as the rates changed, but always with the reservation regarding the Commission's jurisdiction.

When the Maryland and Virginia commissions granted rate revisions in 1947, involving both upward and downward changes in the number of message units applied to various interzone calls, the FCC ordered suspension of the increased rates and scheduled an investigation into the company's rates and regulations dealing with interstate service in the Washington metropolitan area. The C. & P. companies, supported in their position by the respective state commissions and the National Association of Railroad and Utilities Commissioners, reiterated their position that the state commission-ordered rates were the lawful ones, and refused to file suspension supplements.

The FCC scheduled a hearing for March 24, 1947, but subsequently postponed it. At the end of that month, a conference was held between federal and state regulatory officials and telephone company spokesmen to resolve the situation, but no formal agreement was reached. Since then, the C. & P. companies pointed out,

Thompson Chemicals

FIRST NAME IN BRUSH KILLERS



New....Superior

LOW VOLATILE

BRAMBLE-WEEDICIDE

2,4,5-T **2,4-D**

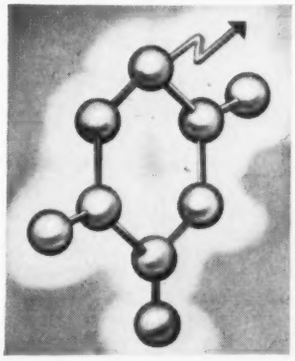
CUTS CLEARANCE COSTS

- **PENTYL ESTERS FOR LOW VOLATILITY**
- **EXTRA HIGH SURFACE CREEP FOR EXTRA KILL**
- **ABSORPTION RATED FOR EFFICIENT WOODY GROWTH CONTROL**

Delivers More Killing Units Per Dollar

Bramble-Weedicide, the new, improved Thompson brush killer specially recommended for clearing rights of way, is 70% more economical than mechanical or hand clearing methods. Up to 25% more effective and economical than older chemical controls.

Whether you spray foliage by air, truck or tractor or from knapsack, or employ basal bark treatment, you get positive kills of even hardiest species at lowest cost per mile with Thompson's superior Bramble-Weedicide.



Special low volatile tailor-made pentyl esters, absorption rated for quicker translocation, more effective results. An exclusive creeping agent adds increased surface contact on leaf or stem for extra action.

Write, describing nature of growth and type of job for helpful information on what to apply, how to mix and when to spray for maximum economy and effectiveness. Thompson manufactures many kinds of brush and weed killers. Caution: Order NOW to be assured of ample supply.

DISTRIBUTORS. SOME TERRITORIES STILL OPEN

Thompson Chemicals

other **superior**

WEED & BRUSH KILLERS

- **WEEDICIDES:** 2,4-D Esters and Amines
- **BRAMBLCIDE** 2,4,5-T Low Volatile Ester
- **PHYTOCIDE** } General Weed Killers
- **PENTA-WEEDICIDE** }

Thompson **CHEMICALS CORP**

St. Louis 3, Missouri
Los Angeles 27, California

"Even if it doesn't draw pay checks, that KOPPERS POLE has 30 years of honorable service, too!"

● He's right! This Koppers Pole doesn't draw pay checks; in fact it hasn't cost the company a cent since it was put in 30 years ago. That's really honorable service.

Koppers Pressure-Creosoted Poles are famous for giving decades of dependable service—the kind of service that makes your line operation easier . . . holds maintenance expense to a minimum . . . cuts replacement costs appreciably.

It will pay you to specify Koppers Poles. They are sound and serviceable—and they *stay* that way.

KOPPERS COMPANY, INC. PITTSBURGH 19, PA.

KOPPERS PRESSURE-CREOSOTED WOOD

nothing has happened, except their filing of monthly reports.

Appropriations Committee OK's Funds for REA's Telephone Program

VIRTUALLY THE entire amount asked for the Rural Electrification Administration's telephone program in President Truman's budget, both for loan authority and operating funds, was approved by the House Appropriations Committee in reporting out the Agriculture appropriations bill for the upcoming fiscal year, and endorsement by the House was viewed as likely.

It was made certain that REA will have sufficient loan authority to cover all the loans its staff will be able to make. In addition to the $25 million new loan authority granted, and whatever amount is carried over from the current fiscal year, the appropriations bill also includes a $10 million contingent fund for telephone loans. The committee also forecast that additional loan authority would be provided if necessary.

Although the committee made a small reduction in REA's administrative funds for the upcoming fiscal year—$8,290,000 as against $8,425,000 recommended in the budget—the figure is exactly the same as that appropriated for the current fiscal year.

In hearings before the House committee, REA Administrator Claude R. Wickard said that loans are being made to small telephone companies by private agencies which did not extend such credit before the advent of the REA telephone program.

The REA Administrator said that during the current fiscal year the agency may draw on the contingency funds approved by Congress last year, since there was less than $10 million of unused loan authority remaining at the time of the hearings (Feb. 12). He declared that the amount of funds actually advanced has been "disappointing," noting that the telephone program is more complex than electrification.

By projects, REA's proposed use of its fiscal 1953 funds included $519,000 for loan analysis and system development; $670,000 for engineering and technical standards; $221,000 for management advisory activities; and $280,000 for loan auditing, collecting, and accounting. All showed increases over the 1952 fiscal year, except loan analysis and system development. The overall telephone program figure was $1,692,000, up from $1,474,000 for fiscal 1952 and $1,227,000 for the 1951 fiscal year.—THE END.

NEW DU PONT 80% CMU WEED KILLER

KEEPS GROUND BARE OF ALL VEGETATION . . . OUTSTANDING TO PREVENT FIRE AND MAINTENANCE HAZARDS IN OUTDOOR INSTALLATIONS

Now Du Pont CMU Weed Killer gives you an effective, economical new control for grass and weeds. One application of CMU keeps ground bare of vegetation for as long as a year!

This new weed killer is absorbed through the roots of plants, and kills all growth above and below ground. Tests throughout the United States and Canada indicate it gives long-lasting, economical control of many types of vegetation to prevent fire and other hazards around outdoor installations.

Du Pont CMU has other advantages, too. It is non-volatile, non-flammable and non-corrosive. In fact, it promises new efficiency in weed control wherever you want to keep the ground bare: around substations, power plants, pole yards, etc.

Get this free leaflet *giving further details on Du Pont 80% CMU Weed Killer. For full information on CMU, "Ammate" and other Du Pont weed and brush killers, write Du Pont, Grasselli Chemicals Dept., 5031 Du Pont Bldg., Wilmington, Del.*

On Rights-Of-Way

AMMATE® KEEPS BRUSH DOWN WITH FEWER SPRAYS

For lower-cost brush control, "Ammate" Weed Killer is ideal. Many users report "Ammate" sprays once every five years control brush along with their rights-of-way. Thus it is possible for maintenance crews to cover more ground more economically. "Ammate" does not leave soil unproductive, so grass and low growth come back to control erosion. It's non-flammable, non-volatile. For further details, write to Du Pont.

★ ★ ★

DU PONT CHEMICALS FOR THE FARM INCLUDE: *Fungicides:* PARZATE* (Liquid and Dry), FERMATE,* ZERLATE,* Copper-A (Fixed Copper), SULFORON* and SULFORON*-X Wettable Sulfurs . . . *Insecticides:* DEENATE* DDT, MARLATE* Methoxychlor, LEXONE* Benzene Hexachloride, KRENITE* Dinitro Spray, EPN 300 Insecticide, Calcium Arsenate, Lead Arsenate . . . *Weed and Brush Killers:* AMMATE,* 2,4-D, TCA and 2,4,5-T . . . *Also:* Du Pont Cotton Dusts, Du Pont Spreader-Sticker, PARMONE* Fruit Drop Inhibitor, and many others. *REG. U. S. PAT. OFF.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

Listen to Du Pont's "Cavalcade of America"—NBC—Tuesday Nights

DU PONT
REG. U. S. PAT. OFF.

150th Anniversary

Better Things for Better Living . . . through Chemistry

Calls for bus information get through *quickly* now! "Busy tone" is rare, for folks in the waiting room are using the new paystation instead of tying up the ticket agent's telephone. *They* like paystations, too—because "there's no need to hurry when you're *paying* to call." . . . In short, *everybody* likes paystations!

That's Why AUTELCO PAYSTATIONS PAY!

Paystations are proving profitable everywhere. They're quickly accepted by the community, and speedily pay for themselves—in bus terminals, stores, hotel lobbies, restaurants, gas stations, and all public places. Progressive companies have proved that the average paystation earns four times as much revenue as a subscriber station.

Write today for new Circular 1724, illustrating profitable 10-cent Autelco Paystations, and kits to convert paystations to the 10-cent rate.

Product of the Telephone Specialty Department of

AUTOMATIC ELECTRIC

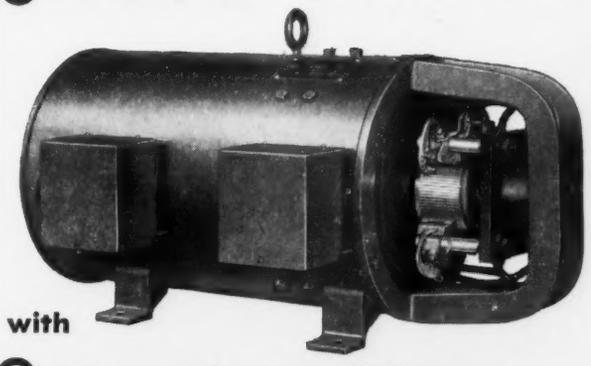
Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems
Makers of Telephone, Signaling and Communication Apparatus . . Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions: Automatic Electric Sales Corporation
Export Distributors: International Automatic Electric Corporation
1033 West Van Buren Street, Chicago 7, U. S. A.

FOR *Time-Proved* BATTERY-CHARGING PERFORMANCE

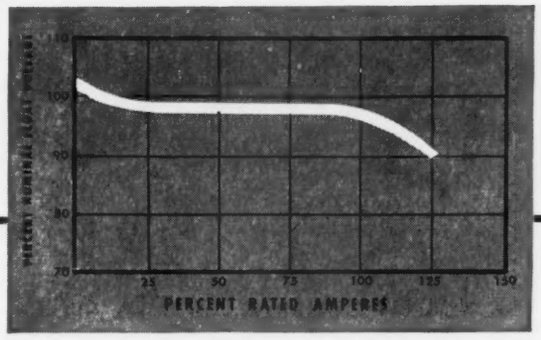
Specify

1 E. P. Diverter-Pole Motor-Generators



with

2 Inherent Constant Voltage . . .



Constant voltage delivered by E. P. Diverter-Pole Motor-Generators serves three important functions:

A—DECREASES RELAY MAINTENANCE. Keeping the voltage from rising too high helps to prevent "slapping" of the contacts that may result in misalignment, pitting and burning, and preserves the sensitive adjustment of the relays. High-coil current . . . with accompanying insulation breakdown, shorting and burning-out . . . is avoided.

B—INCREASES BATTERY LIFE. Operating records of many exchanges show that the E.P. Diverter-Pole Battery Charger increases battery life from six to fourteen years. High battery temperature, excessive gassing, and undue breaking down of the active cell material are prevented to assure the longest possible battery life.

C—IMPROVES VOICE TRANSMISSION. To assure satisfactory voice transmission, the Battery Charger must maintain the output voltage of the battery as close as possible to a constant value. Transmitters may become noisy if they are subjected to an excessively high voltage, and may have to be replaced because of permanent damage.

Write for Bulletin 209

EP

THE ELECTRIC PRODUCTS CO.

1729 CLARKSTONE RD., CLEVELAND 12, OHIO, U. S. A.

CASE TRANSPOSITION BRACKET

CROSSARM TYPE

For complete information Write for Circular 1251 A

The economical way to transpose

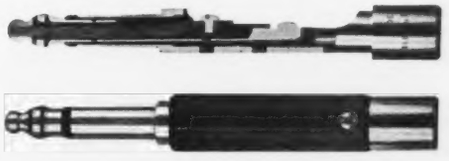
The Case Crossarm Type and Span Type Transposition Brackets have proven to be the most practical method of transposition. Easy tensioning, proper wire spacing and line balancing are all accomplished economically and quickly with this lightweight aluminum bracket.

Revolving insulators on the bracket assure ease of pulling and each insulator is equipped with a rubber bushing which acts as an insulator in case of glass breakage. Tying in the line wires is eliminated and tension in adjacent spans is equalized

BUCKEYE TELEPHONE & SUPPLY CO.
1250 KINNEAR RD. COLUMBUS, OHIO

Avoid Shorts and Trouble

With TFA Plugs



The plastic insulation injected between the conductors stays solid. It covers the edge of the brass shell, positively preventing cause of most shorts. Invented, and used exclusively by TELEFON FABRIK AUTOMATIC A/S for over a generation.

These plugs provide unsurpassed precision in machining, solidity of construction, and high insulation safety.

Available as replacements for all popular two-and three conductor plugs.

Write for list, or order, from either United States distributor.

Sole Distributors in United States

BUCKEYE
Telephone & Supply Co.
Columbus 6, Ohio

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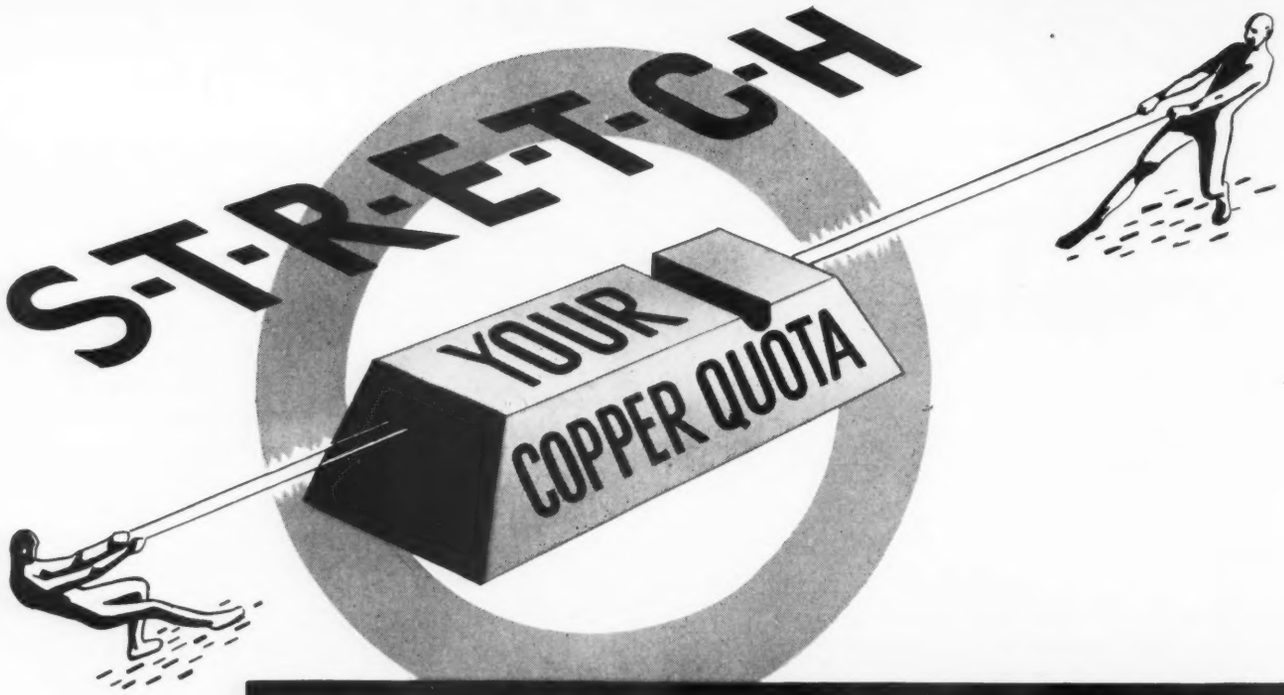
TELEFON FABRIK
AUTOMATIC A/S

AMALIEGADE • COPENHAGEN, DENMARK



COPPERWELD DROP WIRE

Made by GENERAL CABLE

You can order more Copperweld than any other drop wire and still stay within your copper quota . . . for Copperweld is but 30% copper! Copperweld's copper jacket gives high conductivity, excellent voice characteristics. Its alloy-steel core provides great breaking strength—400 lbs., for 18 ga. Use No. 18 Copperweld where No. 17 bronze would normally be indicated. For real economy—and to stretch your copper quota—order General Cable Copperweld Drop Wire.

Manufactured for

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems
Makers of Telephone, Signaling and Communication Apparatus . . Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions: Automatic Electric Sales Corporation
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Where only the best is a bargain!

On a really tough hauling job, a truck's either got it, or it hasn't.

You either make money or you lose it. Only the *best* truck engineered for the job is a bargain for the operator.

That's why you see so many Internationals on tough jobs. That's why you'll be money ahead to see your International Truck Dealer or Branch and get the *best* truck engineered for your job. Why not make it *soon?*

INTERNATIONAL HARVESTER COMPANY · CHICAGO

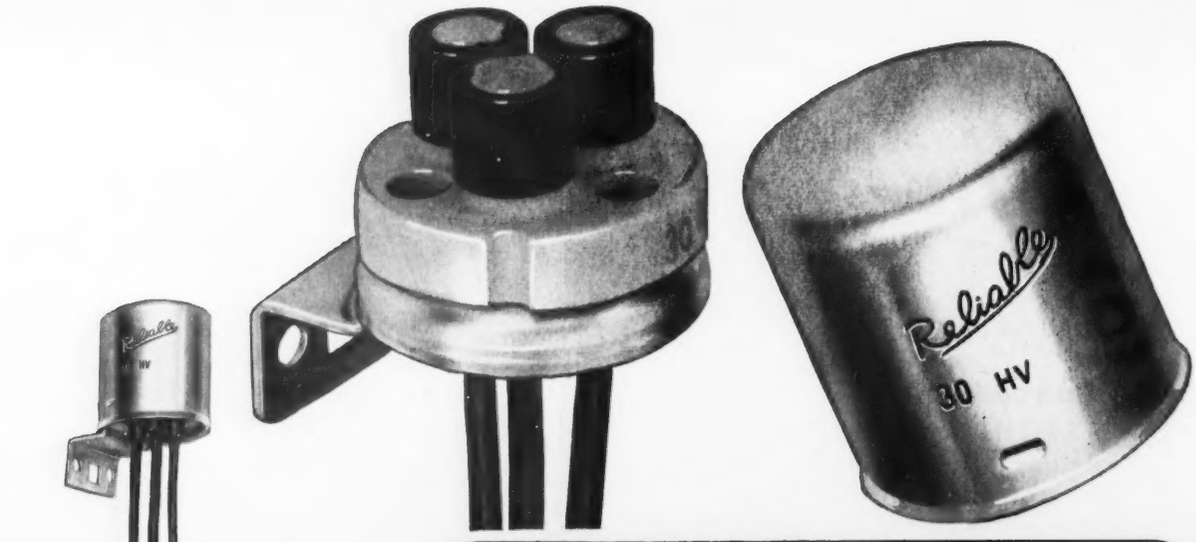
Get the facts about International's features:

- All-truck engines—exclusively for truck work—built in the world's largest truck engine plant.
- The "roomiest, most comfortable cab on the road"—the Comfo-Vision Cab designed by drivers for drivers.
- Super-steering system—more positive control, easier handling and 37° turning angle.
- Traditional truck toughness that has kept International first in heavy-duty truck sales for 20 straight years.
- 115 basic models . . . everything from ½-ton pickups to 90,000 lbs. GVW off-highway models.
- America's largest exclusive truck service organization.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

INTERNATIONAL TRUCKS
"Standard of the Highway"

Model L-192 with special utility body and winch, 175-in. wheelbase, 25,000 lbs. GVW



It's Here, Boss...
The "HV"
(High Voltage — High Current)
PROTECTOR

This Reliable protector is a high voltage, high current unit, factory wired, for use on communication lines joint with power conductors and at power crossing conflicts. The unit may also be used as a high current lightning arrester for two wires. Two sizes are in production — the 30HV with an air gap breakover of approximately 3,000 volts AC, RMS, and a Type 20HV with a breakover of approximately 2,000 volts. The unit consists of three heavy duty, cylindrical carbon electrodes mounted on a steatite ceramic base. This base is attached to an aluminum bracket and covered with a weathertight, bug proof drawn aluminum shell.

One 6 ft. and two 2 ft. No. 10 insulated copper conductors enter the base through neoprene grommets. Wires are permanently connected to the carbon electrodes by solderless method. Cover is assembled to the bracket base with a twist lock — and can be removed for inspection. The 30HV and 20HV protectors are for use on one pair of open wires. Yes, sir, Boss, the "HV" looks like a dandy . . . I think you should ask for a sample for inspection.

Reliable

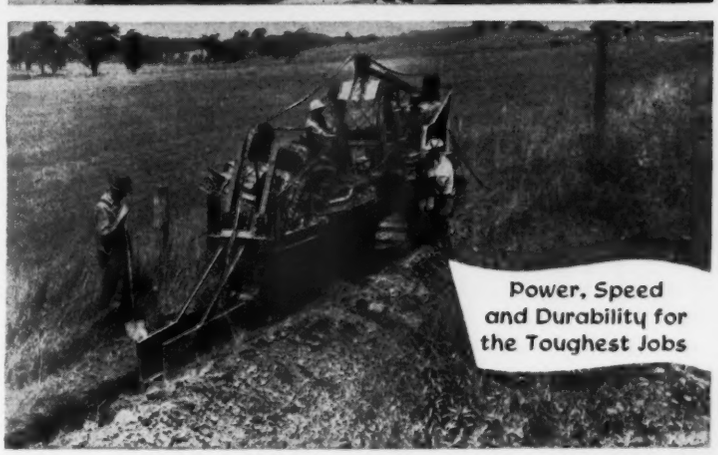
Telephone Protective and Terminal Equipment for all Station, Line and Central Office Needs.

RELIABLE ELECTRIC COMPANY
3145 CARROLL AVENUE
CHICAGO 12, ILLINOIS

OVER 45 YEARS SERVICE TO THE TELEPHONE INDUSTRY

YOU *Do More* WITH CLEVELANDS

more trench . . . in more places . . . at less cost . . .



CLEVELANDS' wide range of speed *combinations,* their wide variety of trench sizes and their famous dependability assure you *more trench.*

Compact, correctly balanced, full crawler maneuverability and lower ground bearing pressure permit working in close quarters, in all soils and terrain — assure fast easy loading for quick jumps by truck and trailer — for work *in more places.*

Correctly designed, built of finer, tougher materials CLEVELANDS conserve fuel and stay running longer *at less cost.*

— CLEVELAND MODEL 80 →

Backfiller • Tamper • Side Crane • Safely Permits Immediate Repaving • One-Man Operated • Saves Time, Work and Money on all Trench Completion Jobs

Manufacturing also Penote Sectional Steel Manhole Forms, Concrete Inserts and Bolts for Cable Racks

THE CLEVELAND TRENCHER CO., 20100 St. Clair Ave., CLEVELAND 17, OHIO

FOR 10,000

KELLOGG *Crossbar* 10 to 10,000 Lines

SUPERIORITY— PROVED BY USE

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But Ready TODAY!

A new era is dawning for Independent Telephony

The future of Independent Telephony is dawning bright and clear—and big! Nation-wide inter-toll dialing is coming over the horizon.

And KELLOGG *Crossbar* is today's answer to tomorrow's demands.

The KELLOGG *Crossbar* dial switching equipment you install today can grow from ten to ten thousand lines—easily, quickly, economically! . . . All *Crossbar* switches and relay units are factory-wired, tested and ready for plugging in! . . . No wiring or soldering is required to add *Crossbar* units! All *Crossbar* switches and relays feature twin precious metal contacts!

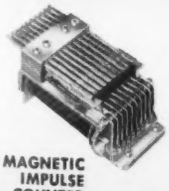
And wear, the age-old bugaboo of maintenance requirements, is all but eliminated because in Kellogg *Crossbar* no switch motion is greater than that of a relay!

For Today—for ten thousand Tomorrows — Kellogg *Crossbar* will save you money and serve you better.

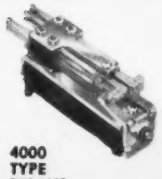
GET THE FACTS— MAIL THIS COUPON TODAY

This interesting, instructive booklet is yours for the asking. Ask for it NOW!

KELLOGG CROSSBAR SWITCH



MAGNETIC IMPULSE COUNTER



4000 TYPE RELAYS

SINCE 1897 KELLOGG

KELLOGG SWITCHBOARD AND SUPPLY COMPANY
6650 S. Cicero Ave., Chicago 38, Illinois

Please send me free copy of "GROWTH"—the story of *Crossbar*.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

SUPPLIES OF Proven Dependability

• Shipment of guaranteed line supplies made from distribution center nearest you . . . Kellogg's warehouses located in Chicago, Kansas City, Dallas and San Francisco.

The following nationally-known manufacturers of supplies for the independent telephone field are participating in the 1952 Kellogg Co-Operative Campaign.

American Creosote Works, Inc.

American Structural Products Co.

Ansonia Electrical Company

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Boston Woven Hose and Rubber Company

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Kester Solder Company

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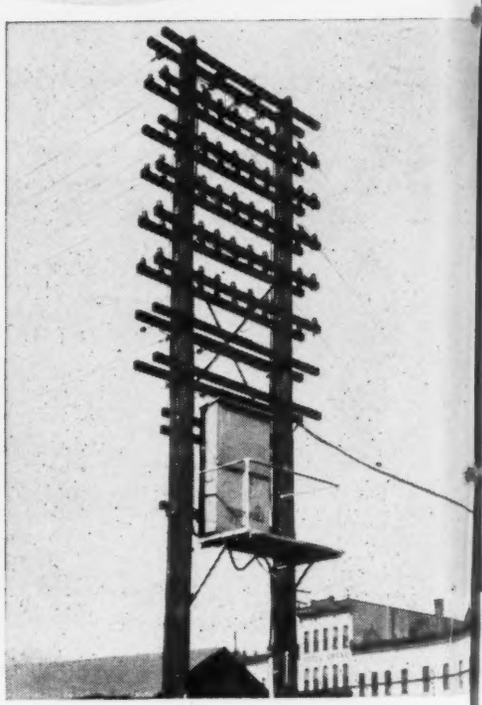
T. J. Moss Tie Company

National Carbon Company
A Division of Union Carbide and Carbon Corporation

National Telephone Supply Co.

Sealed Against Trouble! Communications equipment manufacturers demand Kester Plastic Rosin-core Solder, because it makes a perfect seal. Prevents high-resistance joints and intermittent open-and-closed circuits. Avoid trouble with KESTER SOLDER COMPANY Solder.



Economy in Overhead Construction is assured when crossarms manufactured by the CONTINENTAL CROSS-ARM COMPANY, INC. are a part of your wire and pole installation. Crossarms are made of fully seasoned American wood—built to sound standards of dependability.

Newman Manufacturing Company

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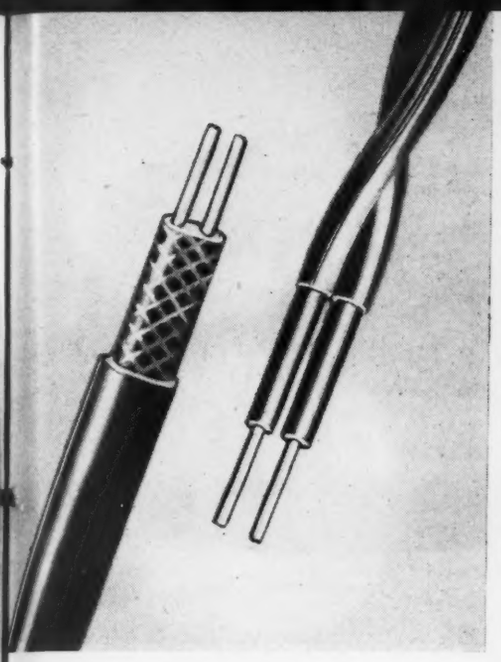

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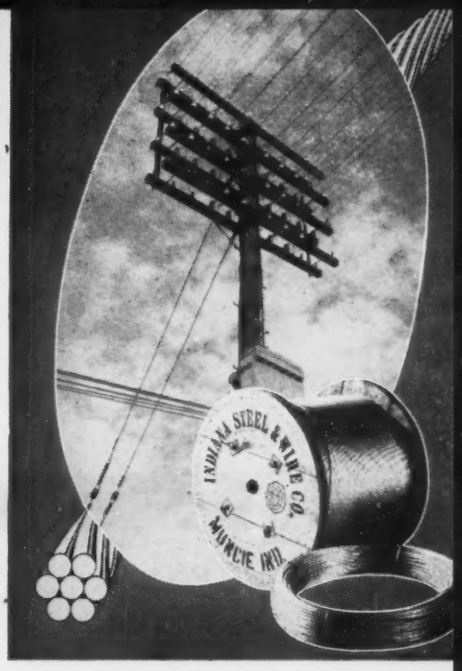

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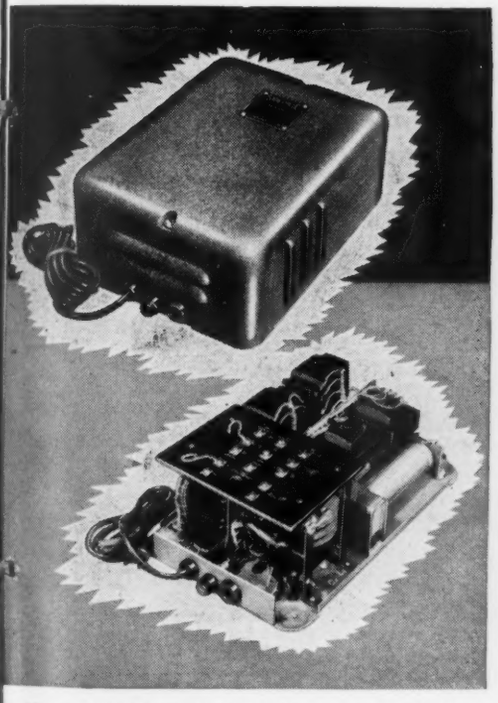

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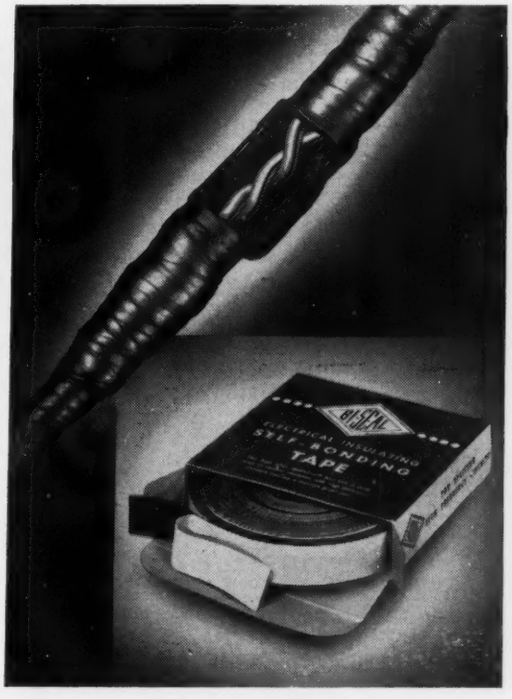

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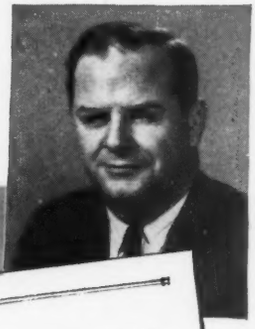

reports P. M. FERGUSON, JR.

Mankato Citizens Telephone Co.
Mankato, Minn.

P. M. FERGUSON, V.P. and GEN. MANAGER — Office 215 South Second St., Mankato, Minn. Tel. 4000

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MANKATO CITIZENS TELEPHONE CO. MANKATO MINN.
INCORPORATED 1898

February 18, 1952

Copperweld Steel Company
Glassport, Pa

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Wet snow and sleet that built up to a diameter of 4 to 5 inches on conductors caused heavy damage throughout this area. All our Copperweld circuits came through in marvelous shape without a failure in service. But on our other lines there were hundreds of wire breaks, with hundreds of poles down.

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Needless to say, we are firm believers in the high strength and good conductance of Copperweld line wire. These pictures indicate that it can really withstand severe punishment.

Yours very truly,

P. M. Ferguson, Jr.

P. M. Ferguson, Jr.
Asst. Gen. Mgr. and Chief Engineer

PMFerguson, Jr:if

IT PAYS TO STRING COPPERWELD!

When building new lines or modernizing old ones, it will pay you to keep in mind the experience of this well-known telephone man. Thousands of operators and builders of overhead lines agree with him that Copperweld* Line Wire can take terrific punishment without service interruptions.

Remember, non-rusting Copperweld Line Wire has greater strength than any wire of comparable electrical properties—and has better transmission characteristics for voice and high frequency circuits than all other types of high-strength conductors.

Because of its permanent strength, Copperweld assures safer long spans . . . is the most economical line wire for dependable, long-lasting construction. Write us today for complete technical data.

*Trade Mark

COPPERWELD STEEL COMPANY, Glassport, Pa.

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Copperweld TRADE MARK Line Wire

SOLD BY LEADING DISTRIBUTORS

Editorial

The Shoe On The Other Foot

THE OTHER EVENING we started in to improve our mind by reading some of the works of the great philosophers.

Before the first chapter of the first book put us to sleep, we ran across the statement, by one of these thinkers, that "change is the essence of life".

The more we think about that the more convinced we are that the old boy had something there—particularly if the statement is applied to the regulation of public utilities as that is done in this country.

Some of you who read this will be old enough to remember the beginning of such regulation—particularly the creation of the first state utility commissions for the purpose of regulating the rates, earnings, practices, etc., of public utilities, including telephone companies.

There was not much opposition in the telephone industry to regulation of the industry by commissions. There were of course a few die-hards who yelled to high heaven about it—but there are always a few die-hards who yell to high heaven about any change in the old order of things.

The concept of the regulation of public utilities by duly constituted agencies of government is sound provided—but only provided—all the important factors basic to it are taken into consideration, and given due weight, by the regulating agency.

One of the basic factors of that concept was and is the obligation of the regulating agency to see that the utility company, as well as the public, gets a fair deal.

Unfortunately, that factor does not seem to be given due weight, even under present-day circumstances, by some commissions.

There still seem to be some commission jurisdictions in which the principal commission endeavor is to hold utility rates down, apparently regardless of the effect upon the ability of the utility company concerned to provide all the service demanded of it, and to get money for that purpose.

That commission attitude may have been more fitting when utility commissions were first created, since the principal purpose for their creation was to prevent utility companies from gouging the public. But the days of exorbitant rates for utility services have long since past.

To date, although the increase in prices of most things has averaged more than 80%, telephone exchange rates have been increased on the average by only about 25%.

Telephone companies are today confronted by constantly mounting costs, expenses and taxes—practically all beyond their control. And, to meet the unprecedented demand for more and more telephone service, they must be able to obtain large sums of money for additional permanent investment in the business—which they cannot do unless their net earnings and dividends are sufficient to attract new capital.

Yet they must, in some cases, fight bitterly every step of the way before commissions to obtain even moderate increases of exchange rates—and must some times even then go into court to prevent confiscation of their property.

It is fortunate that such cases are in the minority, but they serve, we think, to point out a basic change that has taken place in commission regulation since commissions were created.

In the earlier years of commission regulation, a long time ago, it was no doubt a fact that the principal job of commissions was to protect the public.

Now, we think, the shoe is on the other foot. The principal job of commissions today is to protect the companies.

It is only by protecting the companies that commissions can assure to the public the service it wants, at fair rates.

Commission regulation cannot be successful, nor is it in accordance with the whole concept of such regulation, if it is operated as a one-way street.

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...TION METHODS

by John S. Reed

TOXIC AND inflammable gases tend to leak from gas lines, sewer systems, and underground tanks and collect in manholes, conduit runs, and cable vaults. Decomposing matter in swamps, dumps, and mines produce gases that seep into the underground structures. These gases create dangerous hazards which may be toxic poisoning as in the case of carbon monoxide present in manufactured gas or hydrogen sulphide from decomposing matter, or which may be burns or injury to working personnel as the result of explosion or fire. Some gases, such as carbon dioxide (dead air), are dangerous only to the extent that they displace oxygen in the normal atmosphere and cause suffocation. Such gases are found only in extremely deep manholes that are rarely entered.

Gas hazard in cable vaults easily can be prevented by the permanent sealing of the entrance ducts. All vacant ducts are plugged with creosoted wood blocks and all occupied ducts are caulked with oakum. Standard dux sealing compound is applied over the plugs and the oakum to obtain a complete seal.

Gas entrance into conduit runs and manholes is more difficult to control. It is not practical to seal cracks and holes in conduit, and duct entrances into manholes cannot be completely sealed. Vacant ducts can be plugged and sealed permanently, but ducts occupied by cable can be caulked and sealed only during the time work is being done in to manhole; otherwise water will accumulate in these ducts and cause cable trouble. It should be noted here that there are special cases, such as excessive water flow, in which complete sealing of all duct entrances is required.

Fig. 1—Illustrating the Johnson-Williams Model F Combustible Gas Indicator.

Toxic gases are detected by the discoloration of a chemical exposed to the gas. Different chemicals react in the presence of different gases and, for this reason, it is necessary to use the proper kind of chemical for the

Fig. 2—Extracting sample of manhole atmosphere through manhole cover for testing with gas indicator.

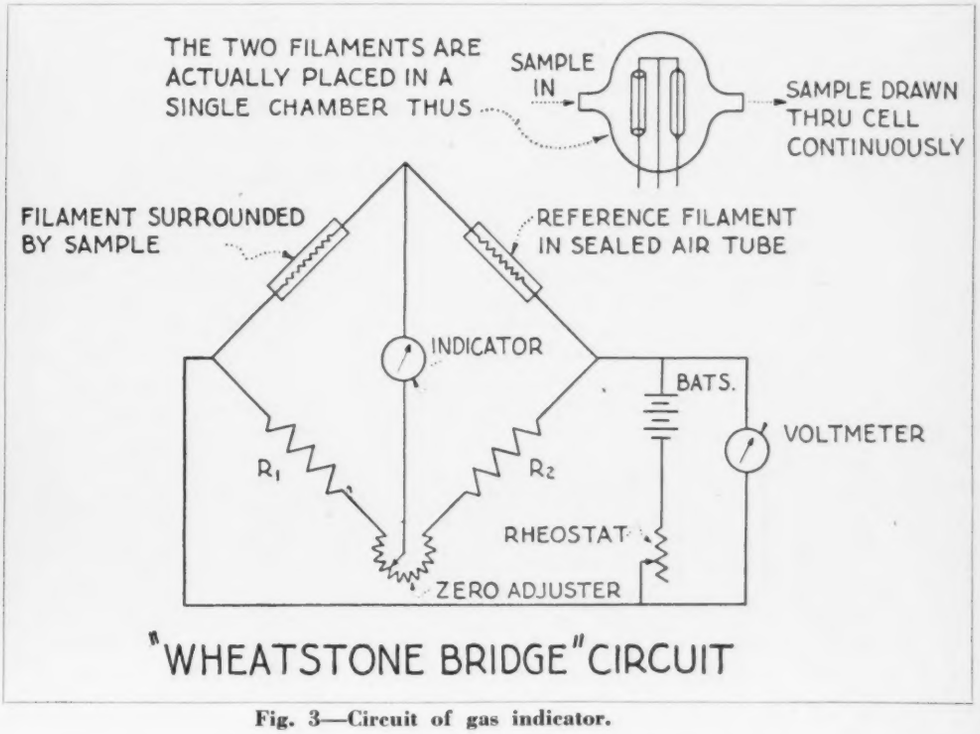


Fig. 3—Circuit of gas indicator.

type of toxic gas encountered. The most common poisonous gas is carbon monoxide which requires the use of a carbon monoxide ampoule. The ampoule is tied to a string, crushed to release the active ingredients, and then suspended in the atmosphere being tested. The next most common toxic gas is hydrogen sulphide which is detected by the use of a similar ampoule containing a chemical that turns black on contact with the gas. A more accurate and rapid carbon monoxide detector is the colorimeter indicating gel tube designed by the National Bureau of Standards. This type of detector tube requires the use of a hose and aspirator bulb to draw the atmosphere under test into a chamber containing the gel tube which changes color in the presence of carbon monoxide within half a minute.

The most dangerous hazard is the presence of an explosive mixture of air and natural or manufactured gas in the manhole. Any kind of a flame or even a tiny spark will set off a terrific blast when the mixture is in the proper proportions. At times the gas will burn without exploding or will not burn at all. In the first instance, the proportion of gas to air is too low to result in an explosion and the gas merely burns when it is heated to the proper temperature. In the second instance, the gas and air mixture is too "rich" to react to the flame or spark. Natural gas, which is mostly methane, has a lower explosive limit of about 5 per cent and an upper explosive limit of approximately 15 per cent.

The "hot wire" gas detector illustrated in *Figure* 1 is a very sensitive and accurate instrument for detecting and determining the explosive nature of the gas and air mixtures in manholes. The set shown consists of an indicator unit, aspirator bulb, and sampling hose with probe. The indicator unit has two meters, one to show the proper voltage setting for the operation of the set and the other to indicate the amount of combustible gas present in the sample drawn into the instrument. The meter scale shows a yellow "Dangerous" range and a red "Explosive" range. The aspirator bulb is used as a suction pump to draw the gas sample into the chamber of the indicating unit. The sampling hose and probe enable the sample to be picked up from a safe location outside the dangerous atmosphere as shown in *Figure* 2.

The detector operates on the principle that, when a mixture of air and combustible gas is brought in contact with a hot platinum wire (or filament) the mixture burns at the surface of the wire. The combustion heats the wire and causes its resistance to increase with the increase in the temperature of the wire. This change of resistance upsets the balance of the "wheatstone" bridge arrangement of the instrument circuit. The amount of unbalance is indicated by a sensitive meter. The reaction chamber and filament are so designed that with an increase in concentration of the combustible gas, a proportional increase in the resistance of the platinum wire takes place. The amount of combustible gas present is thus indicated directly by the meter. *Figure* 3 illustrates the circuit of the indicating unit.

Before using the gas detector, the manhole is opened and ventilated by blowing fresh air into it with power operated blower equipment. (The manhole atmosphere may be tested before removing the cover as illustrated in Figure 2; however, this test will not indicate whether gas is flowing into the manhole or merely has accumulated gradually over a period of time.)

After the manhole has been thoroughly ventilated, the blower is shut off. Samples are then drawn from the upper level of the manhole with the gas detector probe to check the presence of lightweight gas such as natural or manufactured gas. Then samples are taken from the middle and lower levels to check for heavy vapors like gasoline. Finally each of the ducts entering the manhole is checked in the same manner.

When gas is found to be escaping into the manhole, no further work should be attempted in the manhole until the gas company has been notified and has repaired the leak. If no gas is detected in this thorough test, all duct entrances should be

Fig. 4—Straightening long nose pliers.

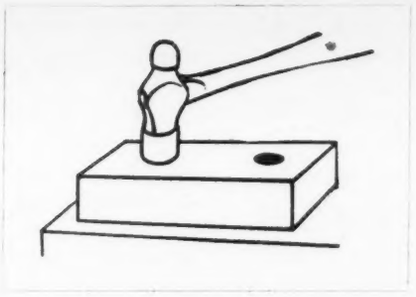


Fig. 5—Use of steel block for adjusting plier joints.

Fig. 6—Testing operation of pliers.

Fig. 7—Improving cross-checking of pliers.

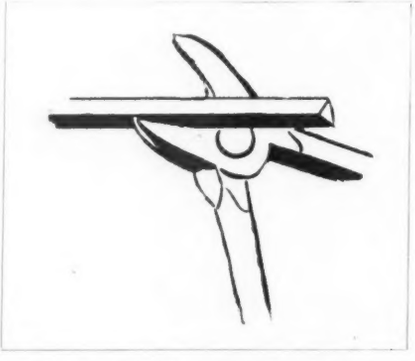


Fig. 8—Stoning out imperfections with India stone horizontal.

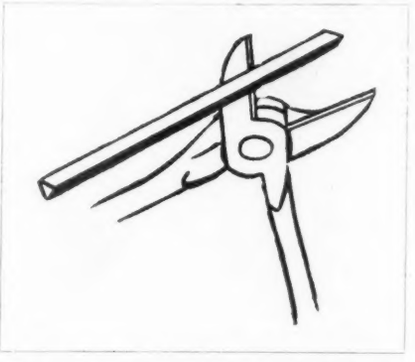


Fig. 9—Sharpening edge with India stone conforming to bevel.

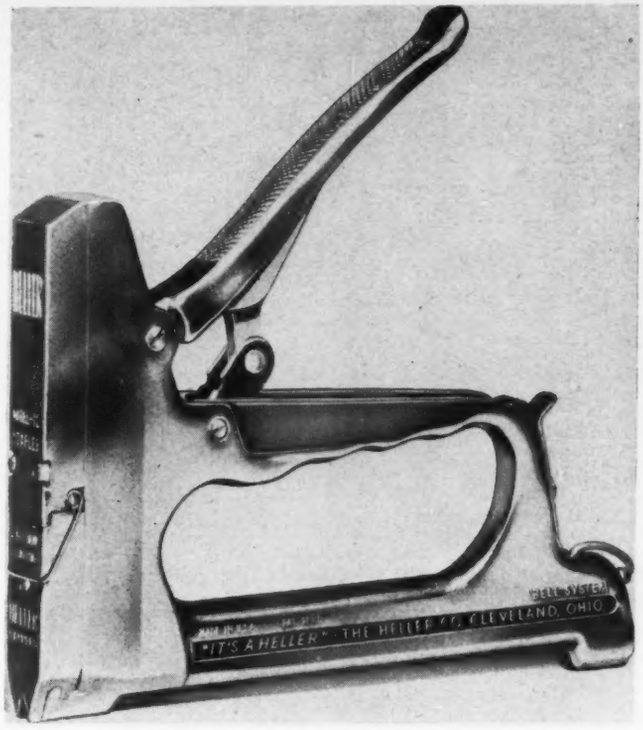


Fig. 10—Appearance of Heller stapling gun.

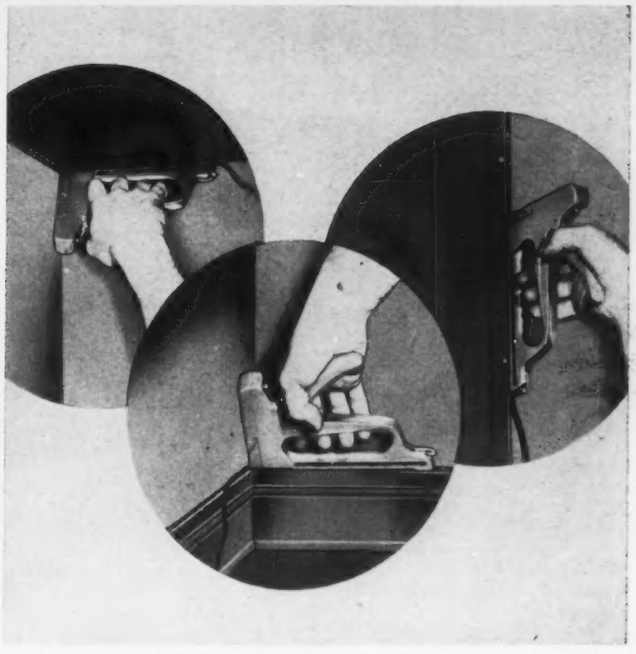


Fig. 12—Using the Heller stapler to fasten interior wire in corners and on wood trim.

sealed as a precaution, and the ventilating blower should be operated continuously throughout the work operations in the manhole. (On completion of the work, the sealing material should be removed from around the cable in the occupied ducts.) The blower should be arranged to force fresh air into the underground chamber through a flexible tubing placed with its opening at the bottom of the manhole. This method is preferable to sucking the manhole atmosphere out and letting the fresh air flow in through the manhole entrance. With the sucking method, a column of fresh air descends to the mouth of the tubing, leaving pockets of gas in the corners of the manhole. When the fresh air comes out of the tubing, the manhole atmosphere is set in turbulence and thoroughly mixed with the incoming air. This mixture flows out through the manhole entrance, leaving only the fresh air continuously pouring out of the tubing.

As long as the manhole is open and men are working in it, samples of the manhole atmosphere should be taken hourly to make sure that no gas is entering the manhole to any extent. As a final precaution, it should be an invariable rule that no flame of any kind shall be brought into the manhole, and no smoking shall be permitted in or near the manhole. A few companies require their men to empty their pockets of matches and lighters before entering the manhole to prevent their involuntary use for lighting cigarettes or pipes from force of habit.

Plier Tools Can Be Repaired

MANY TELEPHONE plant men buy their own diagonal cutters, linemans pliers, and various types of long-nose and duck-bill pliers for use in their daily work. From ex-

(*Please turn to page* 88)

Fig. 13—Installer stapling twisted triple inside wire to floor joist in basement. Note ground wire previously stapled to joist.

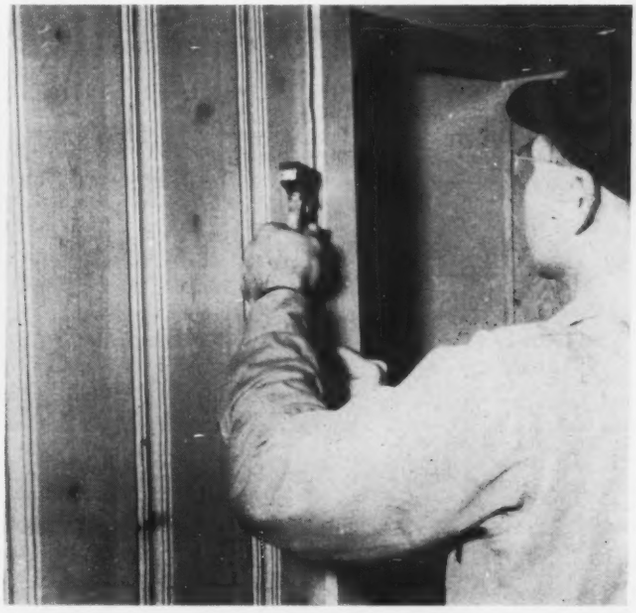


Fig. 14—Installer stapling plastic sheathed inside wire to door trim.

Tall poles are needed to keep the lines clear in this dense Osage Orange hedgerow.

Field corn planted in the right of way will keep brush from coming back.

Contractor bulldozing tangled growths out of right of way.

A good bulldozer operator produced this exceptionally neat right of way.

Clearing the Right of Way

By JOHN G. REYNOLDS

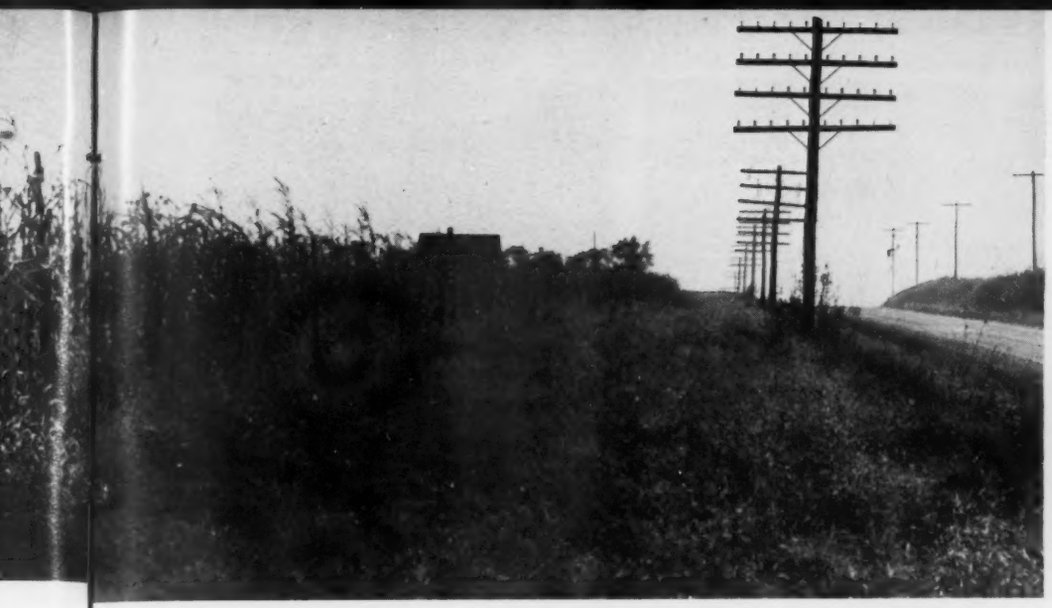
The development of effective eradication methods make it possible for operating companies to clear right of ways with much less effort and expense.

THE ERADICATION of trees and brush along telephone right of ways has long been a serious problem to operating companies. This is especially true of public right of ways abutting private properties. In the early days, settlers and those who came after them planted hedges to mark property lines, keep out wild animals like deer and buffalo, prevent straying of domestic livestock, and provide wood for kindling and fence posts.

For a time, neat hedge rows were the mark of industrious farmers who took pride in their appearance. As farms were mechanized and hired help became expensive and scarce, the farmers paid stricter attention to the more profitable phases of their rural work. The hedgerows thus fell into neglect and grew into tangled thickets that completely surrounded the telephone lines.

To keep the lines clear of these tangled growths, the operating companies were obliged to resort to axes, saws, and brush hooks to cut down the growths. In many cases, they could not secure permission to completely remove the woody plants, and were compelled to cut back branches and shoots to a certain extent as permitted by property owners. In other cases, they were not allowed to do any cutting and had to resort to other methods of obtaining the needed clearance, such as placing taller poles, raking poles out of line, placing extension arms on poles, or building the line on a private right of way.

Fortunately, with recent years the owners have relented and many are



This right of way was cleared the previous year and now has a good covering of grasses and herbaceous plants which will prevent erosion.

Contrast between treated and untreated portions of private right of way one year after spraying with "Ammate." (E. I. du Pont de Nemours & Co. Photo.)

now willing to allow complete removal of trees and underbrush. This change of attitude in many localities was hastened by the requirement of power companies, especially the cooperatives under the Rural Electrification Administration, for clear right of ways for their power transmission and distribution lines. In this instance, the organization often would not build the lines until the abutting property owners gave their consent to complete right-of-way clearance. The owners, being quite anxious to obtain the conveniences of electric power, granted the necessary permission. Naturally, this has made it much easier for telephone companies, in turn, to obtain the consent of the property owners to clear the right of ways for their lines.

Complete eradication of woody plants along right of ways, however, is a very expensive and slow procedure when ordinary cutting tools are used. The cutting methods encourage prolific shoots from tree stumps producing coppice growths which soon become thickets. Every few years or so, it is necessary to cut back these growths. This only makes matters worse in that more new shoots are formed, inevitably producing larger and more tangled thickets.

The development of effective eradication methods now makes it possible for operating companies to clear right of ways with much less effort and expense. More important, those methods promise permanent removal of undesirable woody plants and promote the growth of grasses and herbaceous plants on the right of ways. With clear land up to the roadside ditches, the farmers are encouraged to plant crops in the right of way. This works to the mutual advantage of the farm owner or tenant and the telephone company. The farmer profits from the additional land placed in cultivation and the company is assured of permanent wire clearance. Furthermore, the underbrush formerly was a breeding place for insect pests and noxious weeds like poison ivy, and, with the brush out of the way, there will be less trouble from this source.

Where it is desired to protect wild life, low growing species can be afterwards planted by those interested in wildlife conservation, thus making the eradication of undesirable plant growth less objectionable to these people.

The eradication methods that are coming into wide spread use include bulldozing of the right of ways and chemical spraying.

Division of Costs

WHEN THE cost of eradicating woody growths is rather high, especially in low land areas, where the growths are luxuriant, the operating company can contact the property owners and propose that they all share in paying the expenses of removing trees and shrubs along the right of way. The company, in this case, will offer to pay one-half of the material and labor costs and the owners, the remaining one-half. If they desire, several of the farmer tenants or owners can contribute their share in the form of labor on the project. Such an arrangement is especially advantageous when one or more of the property owners has a

Close up of stump treated with "Ammate" in same area as untreated stump. This stump was treated immediately after the tree was cut down and showed no regrowth a year later.

Sprouts from untreated stump of tree removed the previous year. Note the vigorousness of the regrowth. Several such untreated stumps can produce a dense coppice in a few years. (E. I. du Pont de Nemours & Co. Photo.)

Truck spraying is fast and the equipment pays for itself when enough mileage is involved. Spraying not only kills brush and weeds but also kills off poison ivy. (Thompson Chemicals Corp. Photo.)

Basal bark spraying may be undertaken at any time of the year. Note use of "Ashbaugh Wand" which facilitates thorough spraying of the basal stem. Sprayer is knapsack type.

Basal bark spraying using hose pump from trailer mounted tank. Note truck operator is wearing protective clothing. Basal spraying need not be confined to the winter months but may be carried on during summer.

bulldozer that can be used in the eradication work.

In certain localities, the county authorities may also share in the expenses of the project, thus splitting the cost three ways. In such instances, the authorities are primarily interested in keeping rural mail routes and other important county roads clear and are not too concerned about ordinary section roads. It is their experience that dense hedges and coppice growths along the right of way retard drying of roads after heavy rains and the county officials are usually glad to pay one-third of the expense to obtain clear right of ways that will expose the road to the drying action of sun and wind following rains. In general, counties where right-of-way growths along important roads are very thick are more likely to cooperate in the matter of sharing clearance costs than those where the growths are not so luxuriant.

Probably the best time to make the contact for sharing in the cost of right-of-way eradication is when the operating company finds it necessary to do trimming work to clear the lines of tree and brush interference. At this time the company can explain that the telephone lines are becoming noisy from the tree contacts and that these lines can be rendered permanently free from this trouble if the woody growths are completely removed. It can be further explained that the matted growths are unsightly and detract from the appearance of the farmer's land. Furthermore, the farmer can expand his cultivated areas by adding the cleared space up to the roadside ditch. Actually, due to the removal of the roadside growths, the farmer gains more than just the additional land, in that these undesirable plants are no longer present to stunt crop growth along the edge of the field. The company then can make the offer to split the cost with the owner. If the owner assents, the county authorities can be approached for the proposal to share the expenses with the owners and the company. It is desirable to make the deal with neighboring owners along the same right of way used by the telephone organization so that complete clearance will be obtained along the right of way, whenever this is possible.

Obtaining Permission for Line Clearance Work

USUALLY WHEN the owner assents to the removal of plant growths along the right of way abutting his property, his verbal permission is sufficient. Many companies, however, feel safer to obtain written permission from each owner, particularly when chemical spraying is employed. A standard line clearing permit form is used for this purpose and, in addition, this form may contain a paragraph which specifically releases the telephone company from responsibility for damage claimed by the owner to have occurred from the clearance work.

Permission for line clearance work along state and federal highways is required by state highway departments. Work along unimportant county or section roads seldom requires prior consent from the authority in charge.

It may be possible to obtain a blanket permit from the state highway department to handle line clearance jobs along important highways. This takes the form of a permit prepared on a standard form or as a letter of authority detailing the work to be done and listing the highways included in the work area. A field representative of the highway department usually accompanies the company field man or manager on an inspection trip throughout the area and discusses the details of the proposed work with him, after which the permit is issued. The line clearance work permitted may include trimming certain trees, removing other specified trees, thinning out or cutting back hedges and shrubs. Complete eradication of woody growths usually will not be allowed because of state conservation laws.

Stump treatment with knapsack sprayer. (Dow Chemical Company Photo.)

Bulldozing Right of Ways for Line Clearance

ONE SATISFACTORY way to completely and permanently eradicate trees and brush along a right of way is to employ a bulldozer

Trailer mounted tank and gasoline-engine driven pump for continuous spraying operations.

to entirely remove the woody plants, roots and all. This method is particularly suited for removing dense hedgerows and thickets along high grade toll and trunk lines. Inasmuch as the land is scraped bare of all plant growths, the property owners should be encouraged to plant crops or soil retaining grasses to minimize erosion of the right of ways.

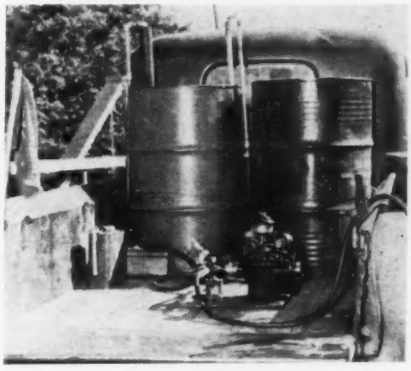
When one of the property owners in the right-of-way clearing deal has bulldozing equipment, he can handle the clearing work. In most cases, however, a local contractor will have to be contacted to furnish and operate the bulldozer. The telephone company handles the part of the deal whereby the property owners and county authorities are contacted for an agreement to have the contractor bulldoze the right of ways and pay their share of the cost. Some companies, however, may prefer that the contractor deal directly with the property owners, particularly when the contractor is a reliable person who can be depended on to handle the clearance work in the proper way. The operating company pays the property owners its share of the contractor's charges for the work, and the owners in turn pay the contractor in full.

In the case of fenced properties along the right of way, it is desirable to have the property owners remove the fences prior to the clearing work and replace them on completion of the job, without charge to the Telephone Company. The trees and brush taken out in the bulldozing operation can be piled in the field for burning or other disposal by the property owner or pushed into ravines or gullies as a soil conservation measure.

Although research is still continuing on the use of herbicides to control woody growths, the chemical spraying of right of ways is becoming a standard practice. Chemical sprayings costs much less than hand cutting or plant growths and, when properly done with the right types and proportions of chemicals, it is very effective in eradicating the woody growths.

The types of chemicals used for spraying woody growths are ammonium sulphamate and combinations of 2, 4-D and 2, 4, 5-T esters.

Ammonium sulphamate under the trade name "Ammate" may be applied directly, or mixed with water and a wetting agent or sticker compound and sprayed on the foliage of the woody plants. When used directly, the sulphamate crystals may be applied to notches cut in the base of the standing trees. The trees



Small spraying outfit consisting of 6-HP gasoline-engine driven centrifugal pump, 55-gallon drum with chemical and oil mixture, and hose lines. Tank outlet on left hand side has 2-inch pipe stem to prevent contents from sloshing out and to enable removal of outlet pipe and strainer. Inlet on right hand side is for the by-pass agitator which stirs the spray mixture.

killed in this manner are left standing until the next year when they may be cut down.

If the trees are to be removed immediately, a concentrated solution of the sulphamate is applied to the cut surface of the stump after each tree is cut down or a thin layer of the sulphamate crystals are spread on the cut rim of the sapwood. If the stump is over two feet high, notches should be cut around the base of the stump, close to the ground line, and the crystals applied in the notches to prevent suckers from sprouting from the stump base. The chemical can be applied in this direct manner any time of the year and will produce an effective kill of the trees or stumps.

For brush control, the ammonium sulphamate and water mixture prepared in the proportions recommended by the manufacturer is sprayed onto the brush by means of power spray equipment. A very high percentage of kill is obtained by this method when the spraying is done at the proper time of the year.

Spray drift is not a serious problem with ammonium sulphamate and the chemical is not poisonous to humans or livestock though it may cause skin irritation if left on for sometime. It corrodes exposed metals, however, and this requires thorough cleaning of the spraying equipment after use. This difficulty can be minimized by using stainless steel in the spray nozzles and gun parts and by having exposed metal surfaces coated with automobile undercoating material.

2,4-D and 2,4,5-T Esters for Brush Eradication

ANOTHER FORM of herbicide that has come into successful use is a combination of 2,4-D and 2,4,5,-T esters. Originally, the 2,4-D ester was used alone and, while effective on many weed varieties, it produced erratic results when applied to woody plants. Later it was found that another ester in the 2,4,5-T form was more reliable as a killer of woody growths. Even better results are claimed when the two esters are used in combination. These compounds, when in the ester form, can be readily mixed with water or cheap grades of fuel oil. The 2,4-D and 2,4,5-T esters are not harmful to humans or livestock and will not corrode metals.

The herbicide can be applied as a foliage spray using water as the carrier, or as a dormant season spray with fuel oil as the carrier. Experiments are now being conducted with oil and water emulsions of the 2,4-D and 2,4,5-T esters.

In foliage spraying, a considerable portion of the chemical enters the plant through the leaves, whereas,

(*Please turn to page* 78)

John Bean Ranger self-contained high-pressure spraying unit with hose reels, 200-gallon corrosion-resistant steel tank and refill device. (Photograph from John Bean Division of Food Machinery and Chemical Corp.)

Memo: To a Lady at a

By HENRY GRADY TURNER
Assistant Vice President, Operating Department
Southern Bell Tel. & Tel. Co.

I WONDER IF YOU ladies at the switchboard know what a pretty sight you are!

There you sit at your switchboard —answering calls, establishing connections, ringing, disconnecting, overlapping operations and teaming with a rhythm and graceful smoothness that are the marks of an expert.

Good traffic men can quickly tell about the quality of the service being rendered just by studying the deftness of your hands and taking a good look at your cord handling.

"Just look at them at work," a traffic man will murmur. "There's nothing prettier than a skillful operator doing a good job."

This is something that traffic men and women feel: a deep respect for the precision and skill of operators. Traffic people get right poetic about this at times. We compare an operator's skill with her cords and plugs to an artist's skill with his brush. A well-trained operator is beautiful to see. She's proud of her job, of her workmanship. Her supervisors and her customers alike realize that she's a "winner".

An operator's skill must come with experience, of course. Sometimes, a new operator must wonder what all the talk's about.

"Why should I handle my plugs and cords a certain way?" she asks. "What's all this about developing an operating technique?"

She watches and listens to her instructor and she wonders: "Why should I pick up a cord as close to the key shelf as possible? Why can't I pick it up any old way?

The instructor explains "why" and later, working at the switchboard, the new operator rediscovers the answer for herself. She learns that by picking up the plug properly she avoids the extra action of tossing her cord to get a better hold.

"Why doing it right is the easiest way!" the operator discovers.

But the new operator has other questions. Her board is buzzing. Her customers want service right now.

"Why not just yank that cord out to disconnect?" she wonders. "Why should I grasp the shell of the plug when I disconnect. When I'm in a hurry at home, I just yank out my iron plug by the cord. It seems like that would be good enough here when I'm busy and need my time for more important things?"

But her instructor teaches her there isn't anything more important than correct cord handling, proper testing, ringing, disconnecting, overlap operating and teamwork.

As for yanking, the new operator learns at home that cord yanking can be expensive. Her misused iron cord wears out and she has to pay to have it repaired. She multiplies her small personal repair bill by the thousands of repair bills the Company must pay on abused cords and plugs. The student is becoming a real operator now because she's found out for herself some of the reasons for doing a good job.

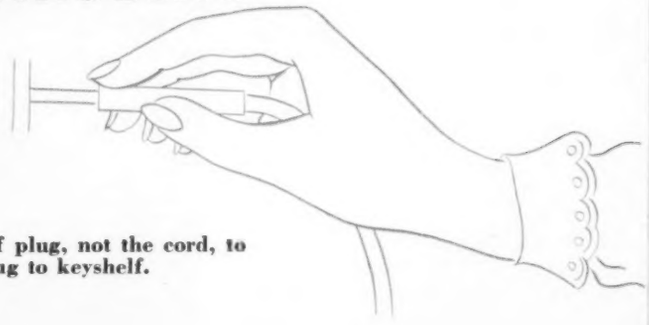
There are other "how" and "why" questions about plugs and cords. Look below and see the answers to some of them. The proper handling of cords and plugs is important. It's a skill to acquire, to practice, to be proud of. And a good operator is always skillful and proud of the important job she does at the switchboard.

THE *Hows* AND *Whys* OF PLUGS

DISCONNECTING

Here's How

Firmly grasp shell of plug, not the cord, to disconnect. Guide plug to keyshelf.



Here's Why

Disconnecting by cord will injure plug and wire contacts in plug. Jerking out the plug can also injure the spring contacts and wear the rim of the jack. Damaged jacks, plugs and cords cause cut-offs, noisy lines, poor transmission. Dropping plug will damage insulation in the plug and cause service trouble.

TESTING

Here's How

Test by making single contact between tip of plug, rim of jack. "No slamming or bamming, please ma'm!" Hold plug at slant so as not to obscure view of jack. Completely seat plug before releasing.

Here's Why

With plug held at correct slant, you can easily select right jack and see the multiple marking. Hard treatment bends tip of plug. Remember a bent plug will also damage the springs in a jack so be careful not to misuse the plug!

Switchboard

Good workmanship means dependable service to the customer and what operator hasn't felt the reflective happiness of a pleased customer! So there is another reason for the proper handling of cords and plugs. Misused cords and plugs can mean a disgruntled customer. Misused cords and plugs can cause four kinds of errors —wrong numbers, cut-offs, double connections and incorrect reports. Defective plugs and cords can cause interruptions, noisy lines and "can't hear" on local and toll calls.

Good, dependable service is the aim of every operator in the telephone business because she realizes that service is the only thing her Company sells. Southern Bell doesn't sell wire or telephones or poles. All these are merely instruments by which we give our customers the best telephone service possible. Skilled workmanship spells good service—I say it again.

And now, our country's defense program has brought another important reason for the proper handling of cords and plugs. Ours is a time of defense projects and increasing shortages of critical materials. Copper, which is important in cords, and brass, which is used in plugs, head the lists of restricted materials.

At home, the operator has to be more careful with her appliances, her radio, her percolator and toaster, her copper-bottomed cooking vessels because she knows they must last her a longer time.

At the switchboard, the operator knows she needs to be more careful too for her telephone equipment must last longer. She remembers this and she handles them with the utmost care. (*Please turn to page* 46.)

Hows and Whys of OVERLAPPING

1. **Place finger on key of cord pair on which recall occurs if not in a position to answer at the moment so prompt answer can be made.**
2. **Answer a second signal while taking up a call circuit trunk, while disconnecting, ringing on local multiple connections, or while operating register, collect or return key.**
3. **While getting in chair pick up cord and open key preparatory to answering line signal.**
4. **While establishing a connection, take down disconnects, make initial or subsequent rings.**

AND CORDS

PASSING CORDS

Here's How

Pass a cord as politely as you pass a teacup. Hold tip of plug toward you and pass cord to next operator so she can easily grasp the shell of plug, promptly put it to work. Keep your eyes on switchboard all the while.

Here's Why

Both you and neighboring operator can watch your position as you pass and receive a cord. Correct cord passing avoids confusion and will improve the speed of answer to line signals, recalls, ringing and disconnecting.

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TELEPHONE BOOTHS
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DICKE
AMERICAN STEEL & WIRE COMPANY
USS
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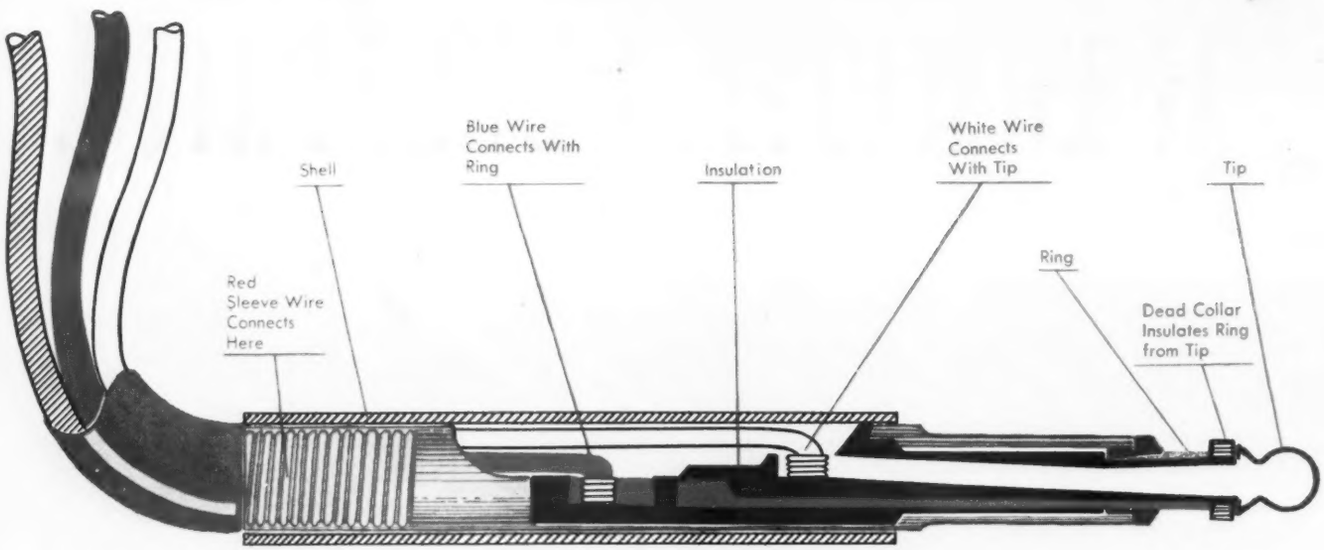
Let's Look Inside a Plug



A PLUG IS THE electrical and mechanical partner of the answering and multiple jacks in the switchboard. Certain parts of the plug touch off specific electrical operations in the complicated central office equipment.

Before the operator can say, "Number Please," the answering plug and cord must do these operations:

The sleeve of the plug operates the cut-off relay, causes the line signal light to go out, and places a busy condition on this line throughout the switchboard.

The tip and ring of the plug (see illustration) make contact with corresponding springs in the answering jack and establish an electrical path from the customer's telephone to the central office for talking, signaling.

The calling cord and plug used to complete the connection operates thusly:

HOW A PLUG IS MADE . . .

PARTS OF SWITCHBOARD PLUGS are made by many different machines, some of which had to be specially developed for the job. At the stage in the process shown above, the various parts come together to be assembled preparatory to the next step—the injection molding process.

INJECTION MOLDING PROCESS is shown here. It is the last word in switchboard plug manufacture. The plastic is heated until it is soft and then injected into the plugs. When it hardens, it prevents the parts from loosening and keeps them in place.

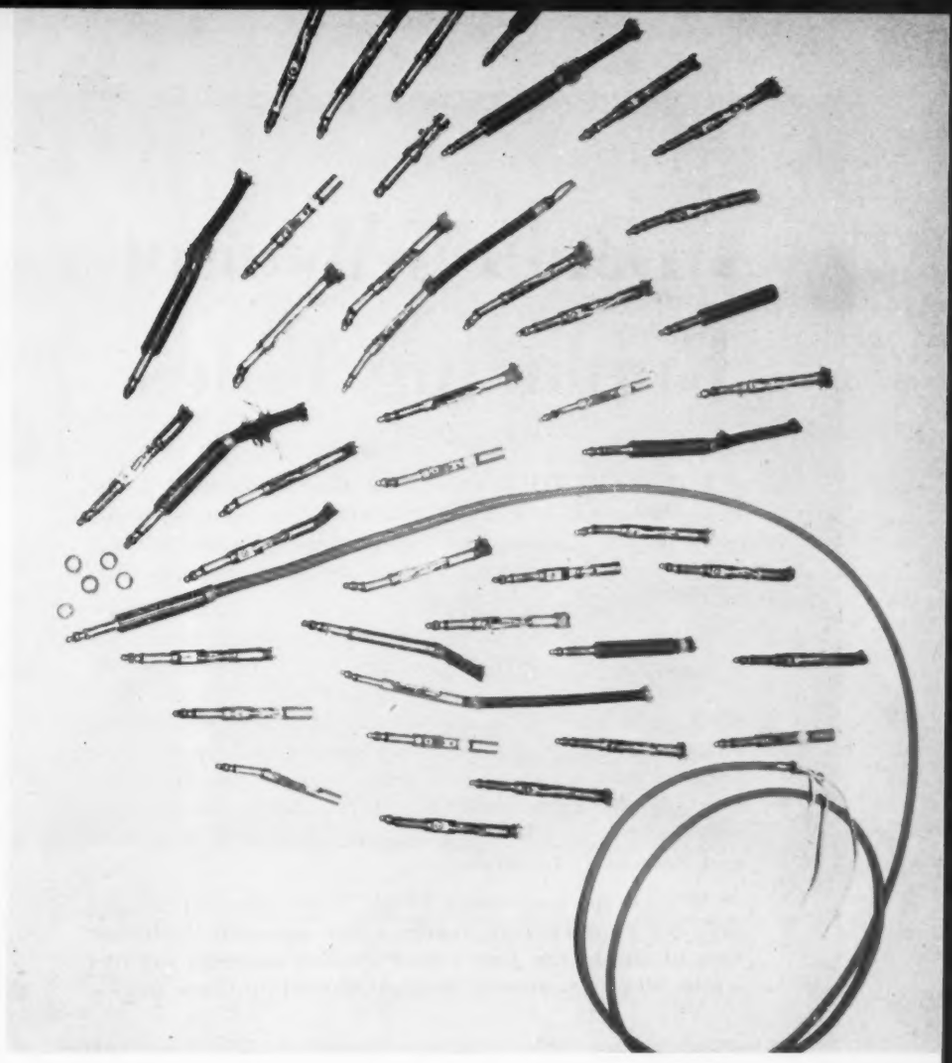
After testing to insure the line is not busy, the operator inserts the plug in the multiple jack. The sleeve of the plug makes contact with the sleeve of the jack and causes the line to test busy to all other multiple appearances of line on switchboard.

The tip and the ring of the calling plug establish the path used in ringing the customer's bell and complete the circuit between calling and called parties for talking and signaling.

Constant research is being made to improve both the plug and cord. For instance, nylon which is used in stockings and clothes, is a fiber that may soon sheath the plug. The Bell Laboratories has developed a nylon shell and insulation collar which is now being used on some plugs that are undergoing fields tests.

And so the search continues to make the operator's job easier by giving her the best equipment possible. Her switchboard partners (the plug and jack) are carefully made, will last a long life if operators do their part in handling them properly.

AT RIGHT is $65 worth of useless cords and plugs. That's what they cost when new but now these damaged cords and plugs are among thousands that have been returned for salvage during the past few months. A new plug and cord, worth about $1.30 alone, rests between the worn out and damaged ones.



AFTER THE PLUGS ARE ASSEMBLED and the plastic injected, they are given a 1,000-volt breakdown test. Plugs are inserted in jacks here and if they do not light the small lamps in the panel above the jacks, the plugs pass the test. They are sent on to be completed by other workers.

COMPLETED SWITCHBOARD PLUGS, plus the outer shells, washers and screws are packaged by one person. Most plugs are attached to telephone cords in the cord shop before being shipped out to the telephone companies as replacement for worn plugs.

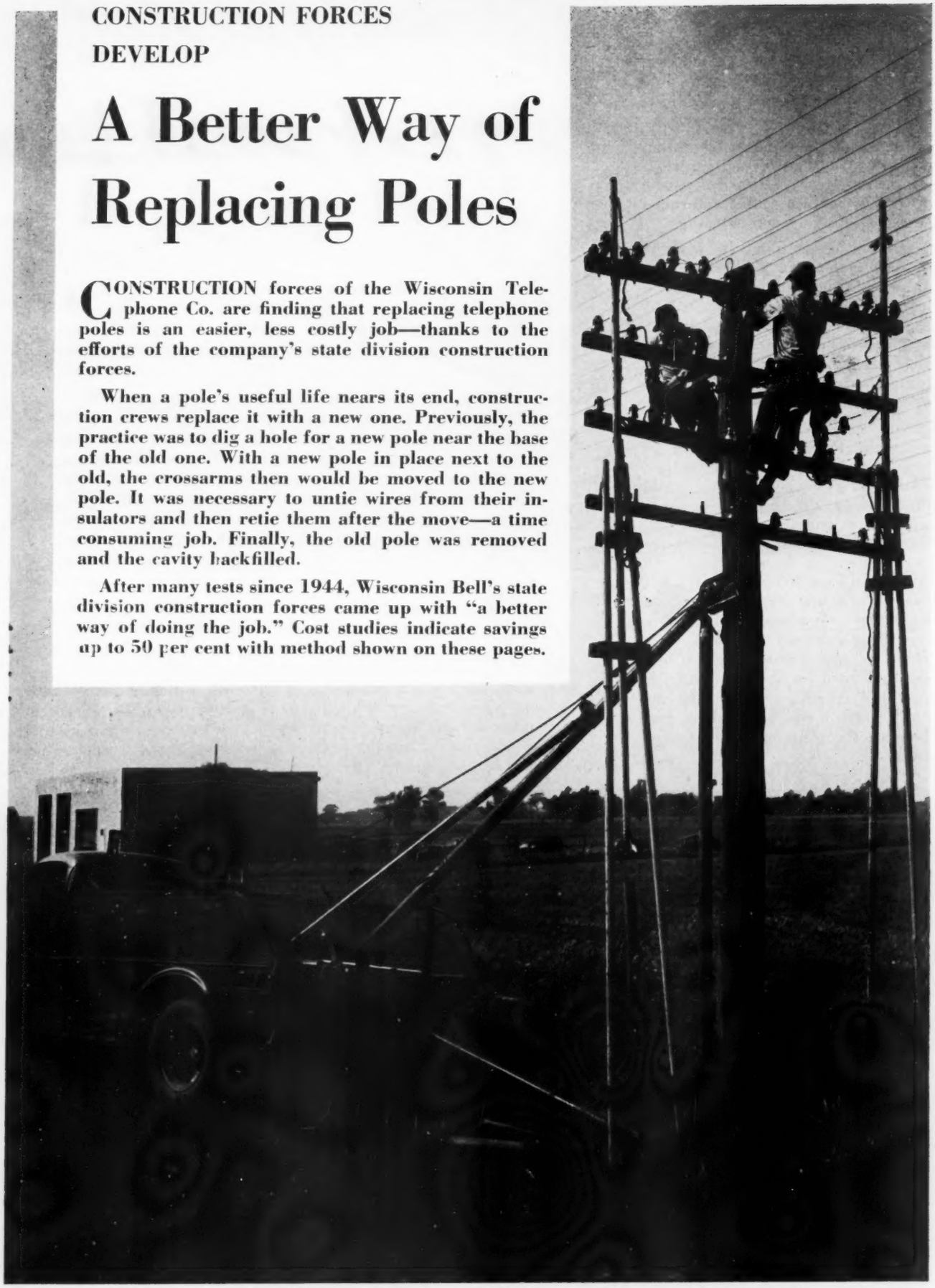
CONSTRUCTION FORCES DEVELOP

A Better Way of Replacing Poles

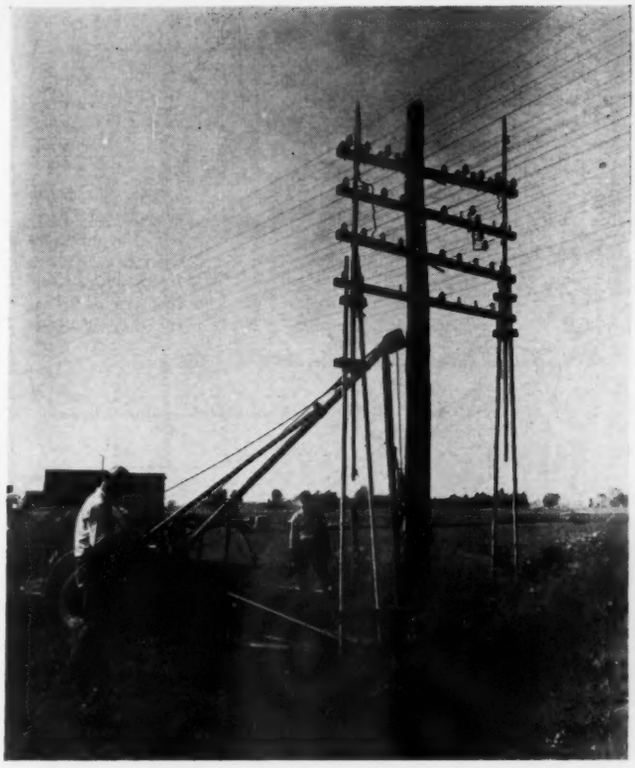
CONSTRUCTION forces of the Wisconsin Telephone Co. are finding that replacing telephone poles is an easier, less costly job—thanks to the efforts of the company's state division construction forces.

When a pole's useful life nears its end, construction crews replace it with a new one. Previously, the practice was to dig a hole for a new pole near the base of the old one. With a new pole in place next to the old, the crossarms then would be moved to the new pole. It was necessary to untie wires from their insulators and then retie them after the move—a time consuming job. Finally, the old pole was removed and the cavity backfilled.

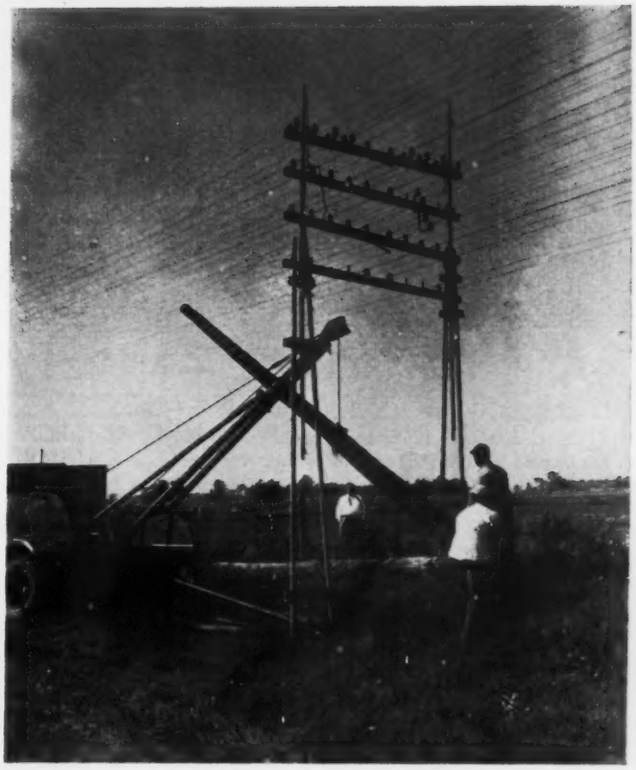
After many tests since 1944, Wisconsin Bell's state division construction forces came up with "a better way of doing the job." Cost studies indicate savings up to 50 per cent with method shown on these pages.



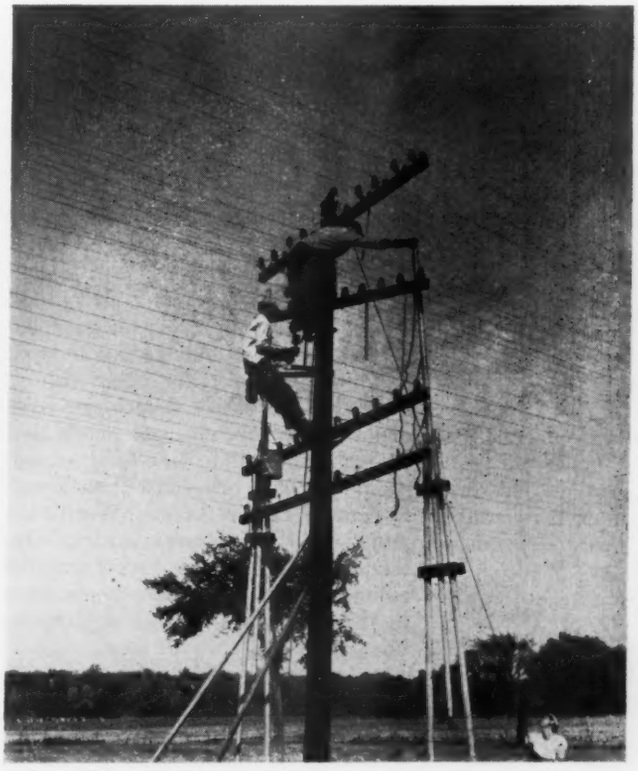
1—Two special transferring standards are made by fastening three pike poles together with wooden clamps. Four-foot lengths of rope either are riveted or run through holes at two-foot intervals on the top of the standards. With the standards raised against the crossarms, the crossarms are tied securely to the supporting standards. Wisconsin Bell linemen Roger P. Niles (left) and James W. LaFond remove crossarm bolts.



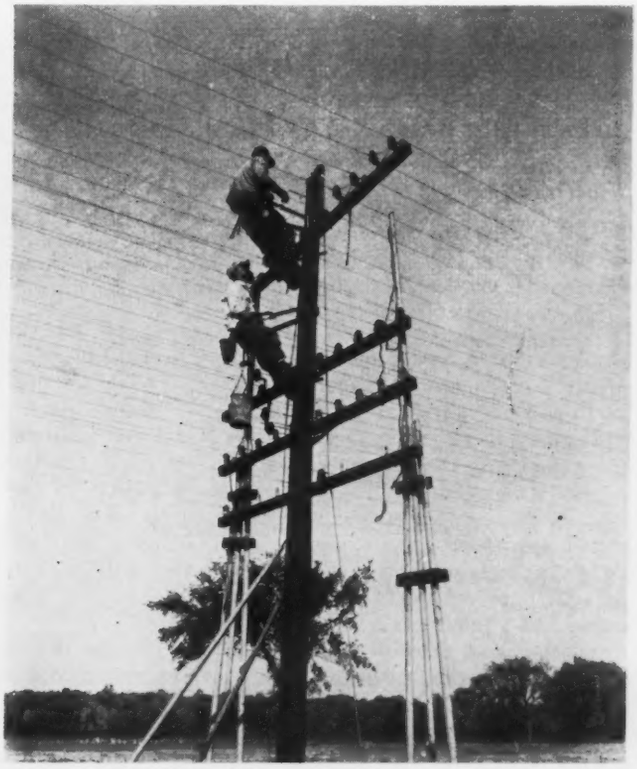
2—With the bolts removed and the crossarms suspended in place on the standards, a truck mounted derrick lifts out the old telephone pole. Lineman LaFond (left) and David J. LaViolette, watch this operation. The standards are of insulation material so that shorting or grounding of the lines is eliminated.



3—The new telephone pole is brought up and placed in the same position as the old one. When it is set firmly in the old hole, the linemen can begin the job of bolting the crossarm to the new pole. If a higher pole is required as a replacement, a portable auger must be used to deepen the hole.



4—On the job pictured here, the crossarms also are being raised to a new elevation. A pole top extension and slack blocks are shown in place to lift the crossarms with wires attached to the desired height. At this point, they are bolted to the new pole.



5—The job of raising each crossarm and bolting it continues until all four crossarms with the wires still attached are in place on the new pole. The standards, which are light enough to be handled by one man, are ready to be moved to the next pole replacement job.

New Ideas In Drop Wire

By RICHARD ALLEN

"Proper stringing methods are just as essential for placing the new type drop wires as they were for installing the saturated braid covered wires . . ."

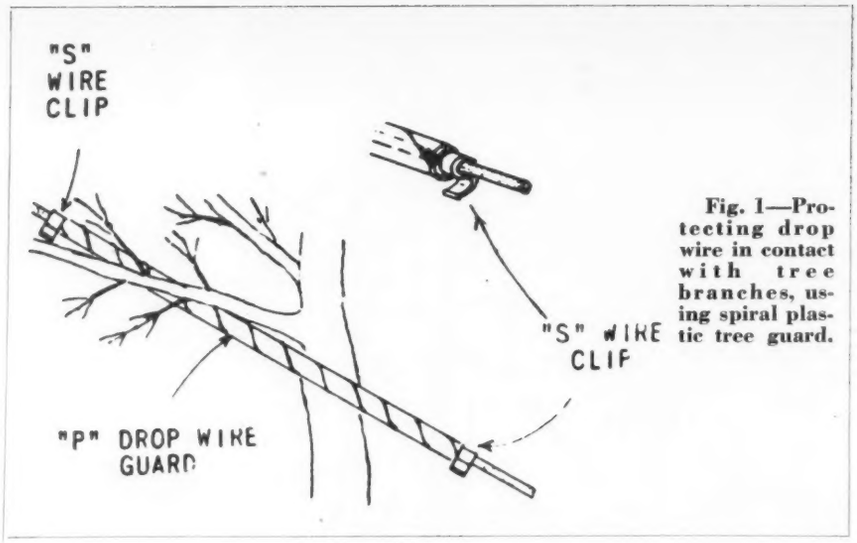


Fig. 1—Protecting drop wire in contact with tree branches, using spiral plastic tree guard.

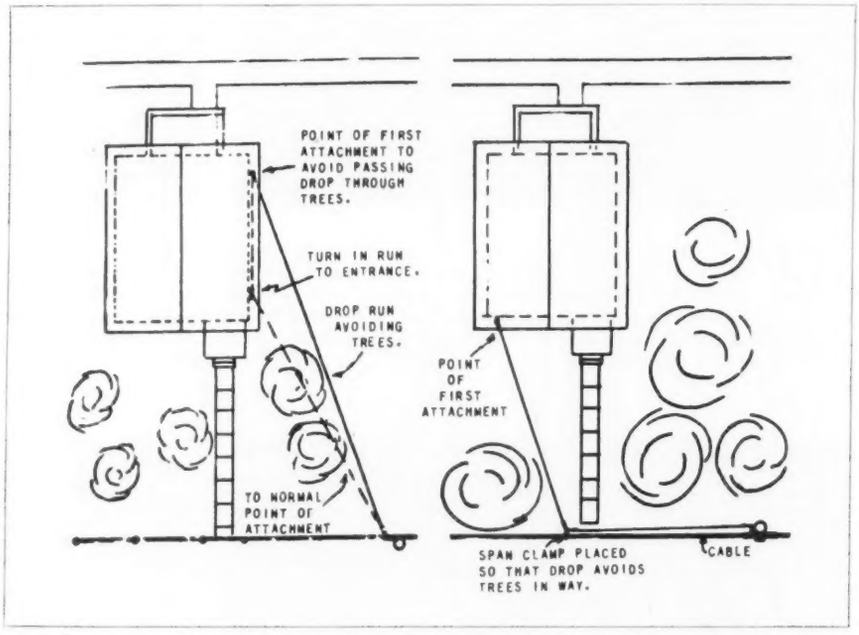

POINT OF FIRST ATTACHMENT TO AVOID PASSING DROP THROUGH TREES.
TURN IN RUN TO ENTRANCE.
DROP RUN AVOIDING TREES.
TO NORMAL POINT OF ATTACHMENT
POINT OF FIRST ATTACHMENT
SPAN CLAMP PLACED SO THAT DROP AVOIDS TREES IN WAY.
CABLE

Fig. 2—Methods of locating drop wire span to avoid contact with trees. Left—Locating drop attachment on another part of the building. Right—Using span clamp to route drop span around obstruction.

THE FIRST neoprene jacketed drop wire was manufactured about 12 years ago. At this time, the du Pont Company was producing a type of synthetic rubber from neoprene ploymer that promised much in the way of durability and long life. Properly compounded with carbon black, wax, anti-oxidant, and certain processing and curing materials, it was resistant to attack by ozone and sunlight, abrasion on obstructions, and deterioration due to contact with acids, alkalies, and petroleum products.

This synthetic material was tried out as a covering for drop wire to replace the asphalt saturated cotton braid that had long been used for protecting the rubber insulation on the drop conductors. These trial tests soon proved the neoprene jacket to be far superior to the braid covering in wearing qualities.

Following the end of World War II when manufacture of neoprene jacketed insulated wires could be accelerated, telephone companies began to switch to the neoprene jacketed drop wire. Today, a large percentage of drop installations by Independent and Bell companies are made with this highly popular type of drop wire.

The use of a high grade synthetic or natural rubber insulation on the conductors under the outer coating is adding to the life of the new type of drop wire. Neoprene by itself is excellent from the standpoint of mechanical strength and stability, but it is not a very good insulator. It is therefore necessary to interpose synthetic or natural rubber with excellent insulating characteristics between the jacket and the conductors. Unlike neoprene, this inner rubber insulation is easily deteriorated by exposure to sunlight and ozone and is readily abraded. One type of neoprene jacketed wire also has a cotton reinforcement between the jacket and the inner insulation which is intended to cushion the jacket and the rubber insulation against crushing in the drop wire clamps at supporting points.

Improved Conductor Material

KINDS OF conductors used in drop wires and their characteristics are listed in *Table One.*

Because of the need for small conductors in the drop wire to keep down the overall wire diameter, to make the wire easy to handle, and to re-

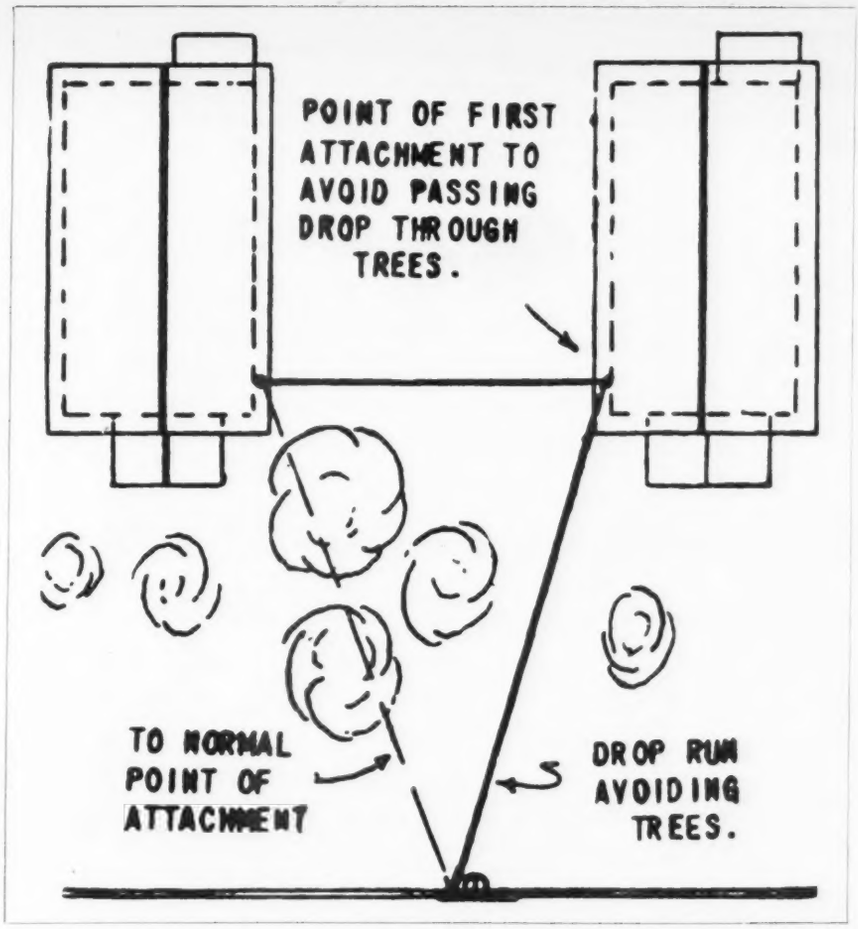


Fig. 3—Avoiding tree contact by attaching drop wire to car garage or to another house (when permission can be obtained for attachment).

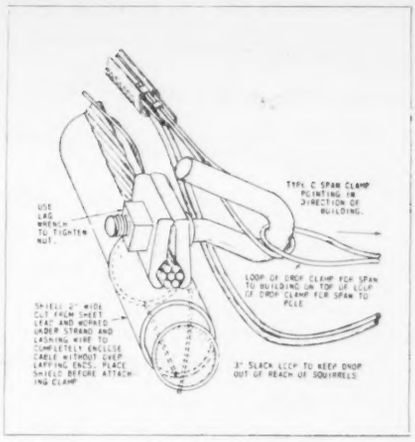


Fig. 4.—Method of attaching Type C span clamp to cable suspension strand.

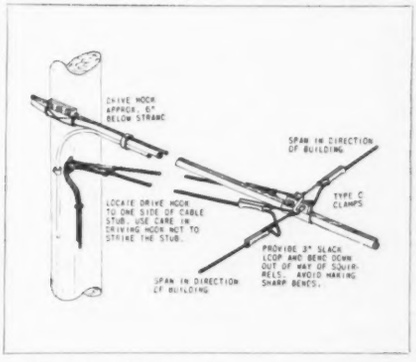


Fig. 5—Placing drop wire spans for distribution from span clamps on cable suspension strand.

duce the cost of perishable insulated wire, hard copper was abandoned in favor of bronze which produces stronger conductors without excessive cost. Drop wire with high strength copperweld conductors is now becoming popular for drop installations.

The use of high strength copperweld conductors makes the strongest drop wire known. Each conductor has a high strength alloy steel core with a uniform welded-on covering of copper which protects the steel against corrosion and subsequent loss of strength. This permanent high strength makes it possible to string the drop on long spans with good safety. It also gives protection against failure under ice and wind loads and minimizes breakages resulting from falling branches and other hazards. In the 18 gauge size, copperweld conductors provide maximum strength at minimum cost.

The copperweld conductors have mechanical stability similar to that of steel, including a high modulus of elasticity and a low coefficient of expansion which tends to minimize changes in sag under conditions of loading and temperature variations. This freedom from excessive elongation under tension also reduces the possibility of cracks or splits in the wire insulation resulting from tension strains.

The copperweld conductors are also resistant to crystallization on short radius bends such as that occurring when the conductor is wrapped around a terminal post. This point is more important than many telephone men realize, since conductor breakage at terminal connections often results when drops are transferred to other terminal posts in pair cuts. The unwrapping and rewrapping of the drop conductors in the process of pulling out and reinserting the wire will, in many cases, break the conductors at the bend. If sufficient slack is not available to reconnect the wire, it will be necessary to splice on another piece of wire to make a length that will reach the terminal posts, involving additional labor and material. Such breakage is less likely to occur with copperweld conductors.

Types of Drop Wire

THERE ARE three general types of neoprene jacketed drop wires commonly used for drop installations, namely, parallel drop wire with cotton reinforcement, dumb-bell pattern drop wire, and twisted pair drop wire. The parallel drop wire with cotton reinforcement is of a type generally used by operating companies in the Bell System. It is available with a neoprene covering of standard thickness for ordinary drop installations or with an extra thick covering for locations where abrasion is likely to be encountered.

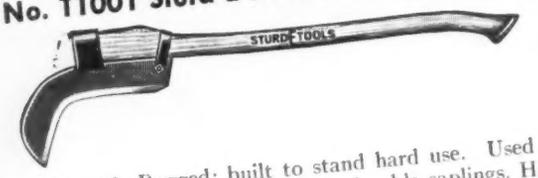
Another and more recently developed type of parallel drop wire uses no cotton reinforcement and has a dumb-bell cross section. This type of wire is gaining favor because of its ease of dividing and stripping for connecting or splicing and yet leaving a protective neoprene covering in place on each divided conductor.

The twisted pair drop wire has the same characteristics as the dumb-bell pattern parallel wire, though the conductors are separate and spiralled around each other. The twisted pair wire is generally preferred by many of the smaller independent operating companies.

Abrasion Resistance Characteristics of Neoprene Drop Wire

THE USE OF a wax compound in mixing the neoprene polymer for making the neoprene jacket produces a smooth finish on the jacket which is an important factor in the resist-

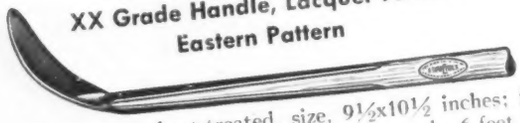
No. T1001 Sturd-E Handled Bush Hooks



Size No. 10. Rugged; built to stand hard use. Used for quick clearance of undergrowth and sizeable saplings. Hickory handle 36 inches; lacquered. Net wt. 4 lb.

Sturd-E Telegraph Spoons

Plain Back—Strap Pattern
Sturd-E with 22-Inch Strap
XX Grade Handle, Lacquer Finish
Eastern Pattern



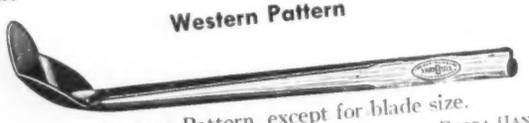
Blade: 13-gage heat-treated, size, 9½x10½ inches; forge finish. Handle, XX grade hickory, maple or ash; 6 feet long.

No.	Length Handle Feet	Size Blade Inches	Net Wt. Pounds Each
TA55	6	9½x10½	9
T55	7	9½x10½	10
T56	8	9½x10½	11
T57	9	9½x10½	12
T58	0	9½x10½	13
T58A	12	9½x10½	15

EXTRA HANDLES

No.	Net Wt. Pounds Each
T65	5
T66	6
T67	7
T68	8
T69	9
T70	10

Western Pattern



Similar to Eastern Pattern, except for blade size.

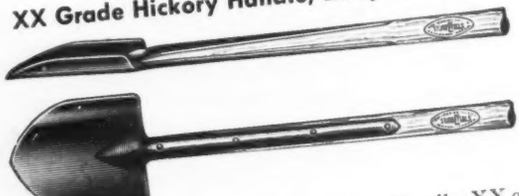
No.	Length Handle Feet	Size Blade Inches	Net Wt. Pounds Each
T49	6	8½x9	9
T50	7	8½x9	10
T51	8	8½x9	11
T52	9	8½x9	12
T53	10	8½x9	13
T54	12	8½x9	15

EXTRA HANDLES

No.	Net Wt. Pounds Each
T65	5
T66	6
T67	7
T68	8
T69	9
T70	10

Sturd-E Telegraph Shovels

Plain Back—Strap Pattern
Sturd-E with 22-Inch Strap
XX Grade Hickory Handle, Lacquer Finish



Blade: 13-gage, heat-treated, forge finish. Handle, XX grade hickory, maple or ash with lacquer finish.

No.	Length Feet	Size Blade Inches	Net Wt. Pounds Each
T15	6	9x12	9
T16	7	9x12	10
T17	8	9x12	11
T18	9	9x12	12
T19	10	9x12	13
T20	12	9x12	15

EXTRA HANDLES

No.	Net Wt. Pounds Each
T27	3
T28	4
T29	5
T30	6
T31	7
T32	8

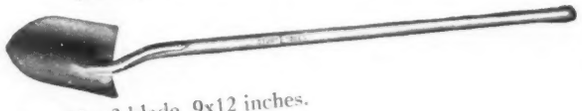
Sturd-E Round Point Shovels

Plain Back, Strap Pattern—with 9-Inch Strap
14-Gage Heat-Treated, Forge Finish Blade
X Grade Ash Handle, Lacquer Finish
No. T842, with 30-Inch Sturd-E D Handle, Type E

Size No. 2 blade, 9x12 inches.
Net weight each, 4½ pounds.

Extra Handles	T75	T76	T77
No.	XX	X	No. 1
Grade	2	2	2
Net Weight Each ..... pounds			

No. T843, with 51-Inch Long Handle



Size No. 2 blade, 9x12 inches.
Net weight each, 4½ pounds.

Extra Handles	T844	T845	T846
No.	XX	X	No. 1
Grade	2	2	2
Net Weight Each ..... pounds			

Sturd-E Solid Shank Round Point Shovels

One-Piece Solid Shank—11-Inch Socket
15-Gage Heat-Treated, Forge Finish Blade
X Grade Ash Handle, Lacquer Finish
No. T823, with 24-Inch Sturd-E Steel D Handle Type E

Size No. 2 blade, 9x12 inches.
Net weight each, 5 pounds.

Extra Handles	T75AA	T76AA	T77AA
No.	XX	X	No. 1
Grade	2	2	2
Net Weight Each ..... pounds			

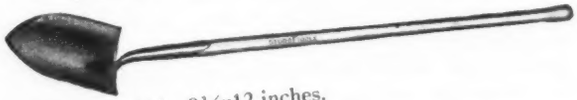
Sturd-E Featherweight 16-Gage Blades

X Grade Ash Handle, Lacquer Finish
No. T-831, with 44½-Inch Sturd-E Long D Handle

Size No. 2 blade, 8⅞x11½ inches.
Net weight each, 4 pounds.

Extra Handles	T844	T845	T846
No.	XX	X	No. 1
Grade	2	2	2
Net Weight ..... pounds			

No. T826, with 46½-Inch Long Handle



Size No. 2 blade, 9¼x12 inches.
Net weight each, 5 pounds.

Extra Handles	T844	T845	T846
No.	XX	X	No. 1
Grade	2	2	2
Net Weight ..... pounds			

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PAGE 89 FROM THE LEICH CATALOG

MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

ance of the material to abrasion. An interesting and important fact concerning this abrasion resistance characteristic is that it gradually increases with age. The neoprene jacket actually becomes progressively tougher after installation of the drop wire. This contrasts with the rapid deterioration of saturated braid drop wire when exposed to abrasion even on light contact with small branches and twigs.

One company made the experiment of installing neoprene jacketed drop wire in an exchange area without taking the usual precautions to prevent undue contact of the wires with trees and high shrubbery. The only care exercised was to provide not less than the specified minimum sags in stringing the wires to prevent excessive tension at supporting points and to enable the wires to sway with the movement of large branches and small trees at contact points. Regardless of their condition, all old drops were replaced with new neoprene jacketed wires. These installations were made over five years ago. To date, no trouble has been experienced other than lightning damage or breakage of wires due to falling objects or other causes. If saturated braid covered drop wires had been used in this experiment, grounds and shorts would have developed within two or three years and all drops exposed to tree contacts would probably have required replacement within the five year period. The breakages reported in this experiment would likely have been reduced if drop wires with high strength copperweld conductors had been installed.

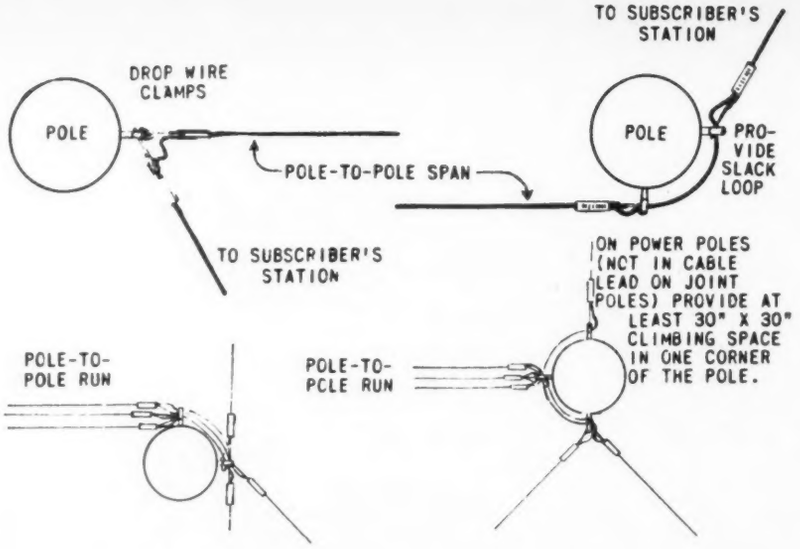
TO SUBSCRIBER'S STATION
DROP WIRE CLAMPS
POLE
POLE
PRO-VIDE SLACK LOOP
POLE-TO-POLE SPAN
TO SUBSCRIBER'S STATION
ON POWER POLES (NOT IN CABLE LEAD ON JOINT POLES) PROVIDE AT LEAST 30" X 30" CLIMBING SPACE IN ONE CORNER OF THE POLE.
POLE-TO-POLE RUN
POLE-TO-POLE RUN

Fig. 6—Methods of distributing drop wire spans from pole at end of Pole-to-pole drop wire run.

The methods of routing drop wire spans to avoid tree contacts and passage over undesirable locations are illustrated in *Figures* 2 *and* 3. The procedure most commonly employed is to place a span clamp on the cable suspension strand to pass the drop around the obstructions or through the desired locations for the span. *Figures* 4 *and* 5 show the details of locating and installing the clamp.

When the use of any of the suggested routing methods is impracticable, it may be possible to run the drop from another pole than the cable terminal pole in the same lead, or from a drop pole set for the purpose. The distribution of the drops from the pole is illustrated in *Figure* 6. Sometimes the attachment can be made to a power or other foreign company pole when permission can be obtained for this attachment. For example, the power company might place a pole in an advantageous location from which it can distribute its power service leads to several houses in the area. The telephone company can secure permission for attaching its drop wires to the same pole for distribution to the same houses. Since a joint pole is involved, it is desirable to place a guard arm on this pole, particularly when several drops are to be distributed.

If the terminal pole is in line with a tree between it and the desired point

(*Please turn to page* 70)

Maintaining Drop Wire Life bp Proper Stringing Methods

PROPER stringing methods are just as essential for placing the new type drop wires as they were for installing the saturated braid covered wires. Even though there is now less compulsion for protecting drop wires from tree contacts, drops will still need to be properly routed from cable terminals or open-wire connections to the subscriber's residence to avoid crossing over private properties, locations for clotheslines, and contacts with power service leads and, if possible, with certain rapid growing trees. Drop wire guards will still have to be used on drops likely to make heavy contact with large tree branches, as indicated in *Figure* 1, though there could be less concern about the effect of small twigs whipping on the unprotected parts of the drop wire outside the guard.

Table One Composition and Characteristics of Alloys Commonly Used for Drop Wire Conductors*

	Signal Bronze	Cadmium Bronze	30% H. S. Copperweld	Hard Copper
Composition, Per Cent				
Copper	98.25	99.00	——	100.00
Tin	1.75	——	——	——
Cadmium	——	1.00	——	——
Zinc	——	——	——	——
Phosphorus	——	——	——	——
Tensile Strength— Lbs./Sq. In., Hard	113,500	90,000	125,000	65,000
Elongation, Per Cent Hard	1.0	1.0	1.0	1.0
Average Coefficient of Linear Expansion/°F	9.9×10^{-6}	9.8×10^{-6}	——	17×10^{-6}
Resistance in Ohms/1000 ft. at 68° F				
#18 AWG	17.7	7.5	21.4	6.385
#17 AWG	14.0	5.9	16.7	5.064
Conductivity, Per Cent	36.0	85.0	30.0	100.00
Breaking Strength— Lbs. (Single Conductor)				
#18 AWG	135	105	200	86
#17 AWG	170	145	240	108

*Furnished by courtesy of Whitney Blake Co.

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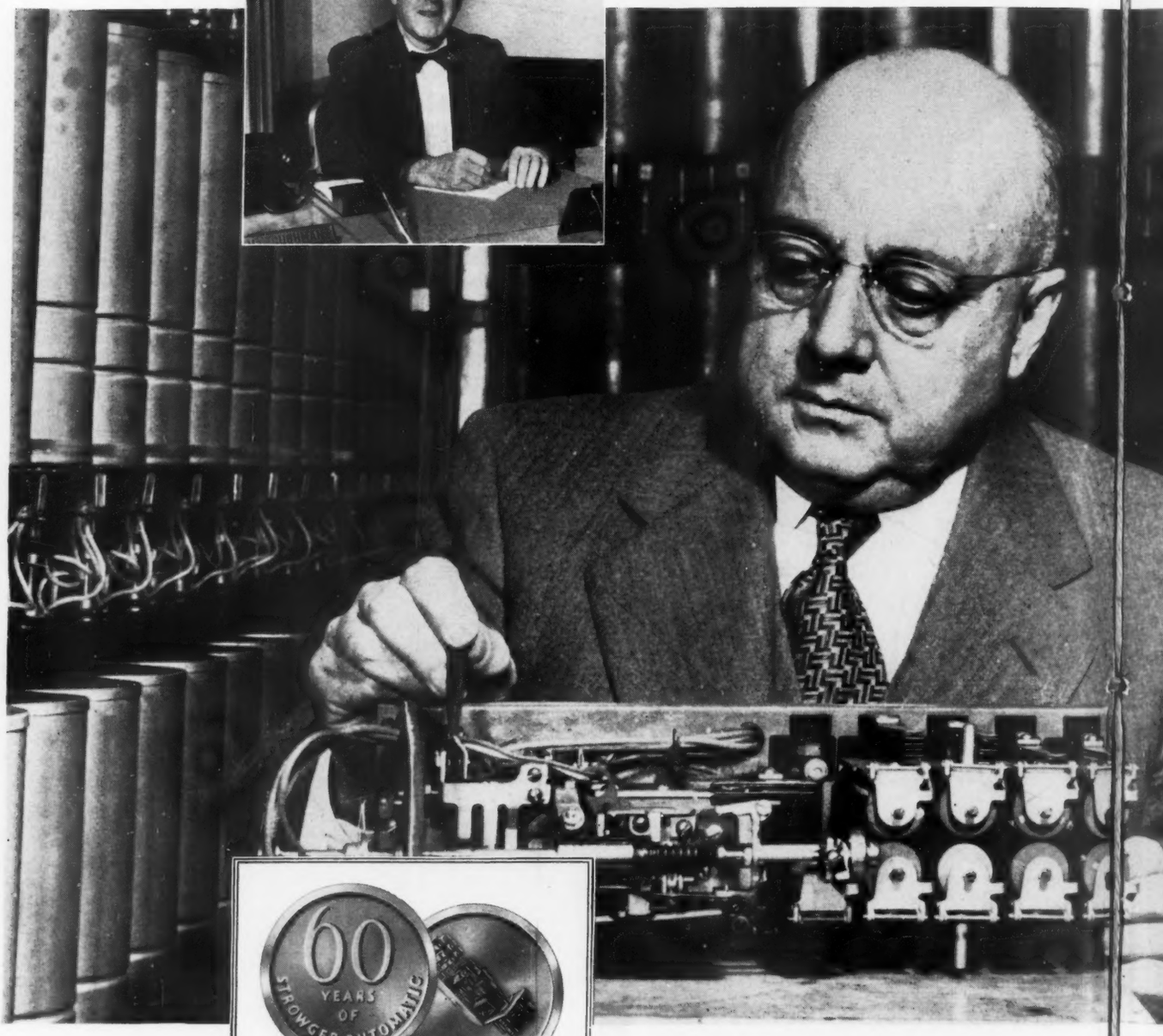
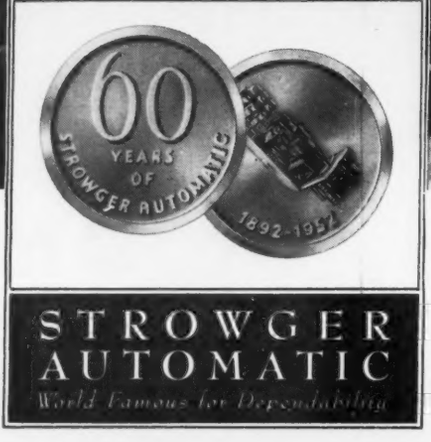
Strowger Automatic proves dependability a





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AUTOMATIC
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1st photo, upper left: Central office building of the W sterly A Company.

2nd photo, upper left: E. L. Cushman, President of the W sterly Company.

Large photo, above: Stanley Livingston, wire chief, che king a Westerly exchange. Behind him is a 1916 new equipment are shown at the ght.

ity at Westerly — 49 Years!

the We erly Automatic Telephone

the Westerly Automatic Telephone

ef, checking a Strowger switch in the
him is a 1916 switch bay. Both old and
t the right.

At Westerly, R.I., Strowger Automatic
has provided longer continuous automatic service
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Our 60-year development of the Strowger switch,
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our constant search for new materials, improved designs and processes,
have given us a fund of skills and knowledge
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to build ultra-modern Strowger Automatic equipment around this switch
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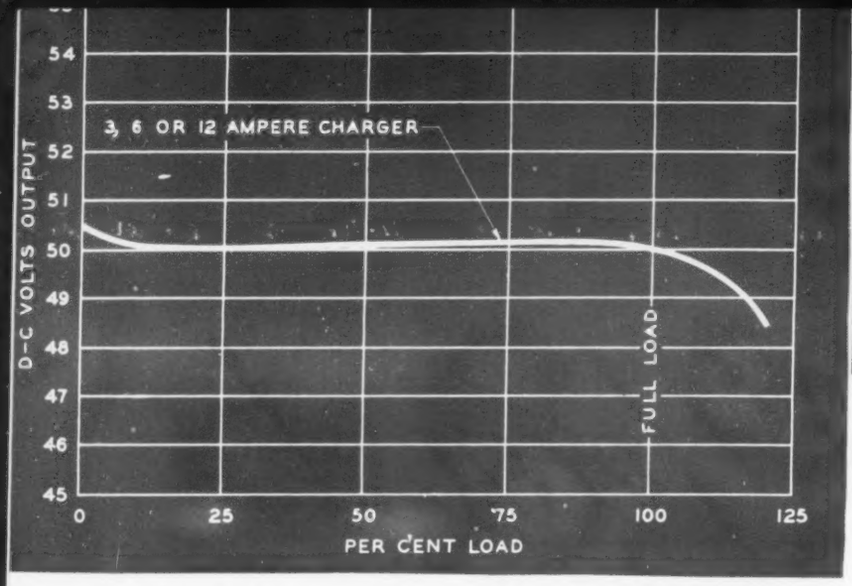


Fig. 106—Voltage output characteristics of the Convotrol chargers.

Modern Central Offic

Section IX-C of Mr. Reed's article continues a discussion of central office battery charging equipment. (Part IX-B of this article appeared in the April Fortnightly Telephone Engineer.)

THE PILOT consists of a permanent magnet and two electro-magnet coils coupled together with a large magnetic core as indicated in *Figure* 105. These coils are connected to 42-volt a-c input terminals. Another core, laminated and of very small cross section is bridged across the sides of the large core between the electromagnet windings and the permanent magnet. This small core carries two windings which are connected series-aiding so as to cause the flux to circulate within the small core as shown by the arrows in the illustration.

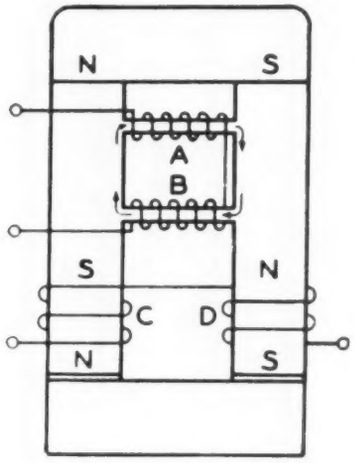


Fig. 105—Construction of the Convotrol pilot used in the regulator unit.

The permanent magnet and the electromagnet are so poled as to cause their flux to combine and circulate around the large core without passing through the small core, provided that the ratio of their magnetomotive forces is equal to the ratio of the reluctances (magnetic resistance) above and below the small core. If the voltage applied across the electromagnet windings decreases, the electromagnetic field lessens, causing part of the flux due to the permanent magnet to pass through the small core. Because of the fact that the large core carries so much magnetic flux, a slight unbalance will divert enough flux through the small core to saturate it. Thus, the effect of a small variation in the battery voltage is to rapidly change the impedance from maximum to minimum.

When the battery voltage is between zero and 30 volts, the permanent magnet flux completely saturates the small core and the charger output delivers its maximum current rating. Above 30 volts, the core begins to unsaturate and in the range between 45 and 55 volts, the impedance rises steeply and the current output drops in proportion. This range is used in the Convotrol to hold the battery at the desired value for floating the number of cells in the storage battery installation.

As indicated in *Figure* 106, the Convotrol unit furnishes a substantially constant floating voltage from no load to full load. Beyond the full load point, the output drops rapidly to prevent overloading of the rectifier. This type of charger has very high operating efficiency as illustrated in *Figure* 107, and has a very low no-load power consumption. The Convotrol charger is available in 3-, 6-, and 12-ampere ratings at 50 volts. When greater capacity is desired, two or more Convotrol units can be operated in parallel. However, the manufacturer recommends the more economical arrangement of a constant current rectifier as the second charger. The constant current charger is cut in when the full capacity of the control charger is exceeded and is cut out when the load can be carried by the automatic charger alone.

Two Types of "Flotrol" Chargers

TWO DIFFERENT types of Flotrol battery chargers are manufactured. The smaller chargers are made for operation from a single-phase power supply, while the larger

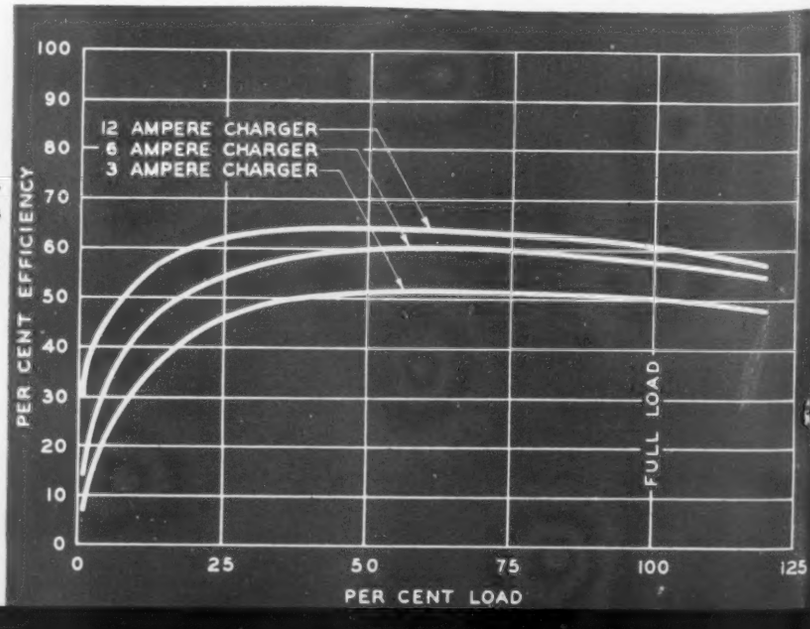


Fig. 107—Efficiency ratings of the Convotrol chargers at various loads.

Office Maintenance Practices

By JOHN S. REED,
Lincoln, Neb.

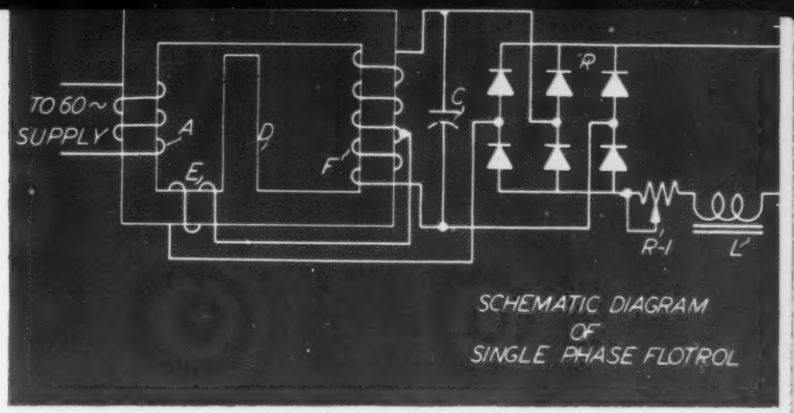


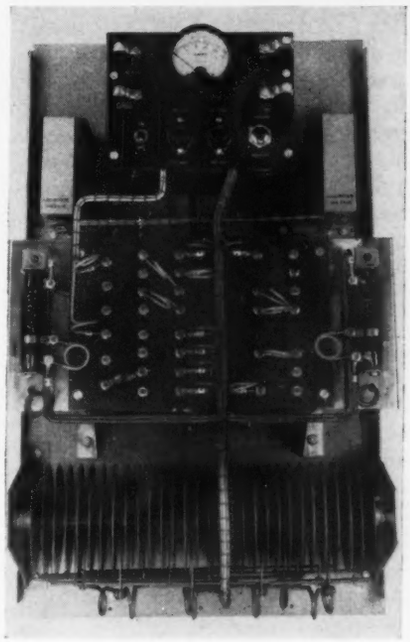
Fig. 109—Circuit of single-phase Flotrol charger.

chargers are designed to operate from a three-phase power supply. The capacity of the biggest single-phase charger is 24 amperes at 50 volts, and that of the smallest is 1 ampere at 24 volts. Three-phase chargers vary in size from 25 to 200 amperes at 48 volts. The output voltage of these units is controlled within ±1 per cent over a range of from 10 to 100 per cent load.

The single-phase Flotrol charger illustrated in *Figure* 108 consists of a single saturable reactor which controls the output voltage, compensating for changes in input voltage and in load to maintain a constant d-c voltage at the output terminals. This compensation is obtained by a saturable leakage-reactance transformer and a three-phase selenium rectifier.

Referring to *Figure* 109, winding A is the primary of the transformer. Winding F is shunted by capacitor C. A magnetic shunt D with an air gap is situated between the primary and secondary windings. When current from the a-c supply flows in winding A, capacitor C is charged and keeps the core section inside coil F saturated. This results in the voltage across the capacitor being substantially constant regardless of variations in the input voltage. A portion of the constant voltage appears across a single-phase full wave rectifier bridge. Although the voltage delivered to the rectifiers is relatively constant, the output voltage of the single-phase rectifier will vary because of the voltage drop due to current flowing through the rectifiers.

To compensate for this voltage drop, the voltage from winding E is fed to another set of rectifier elements which, together with the single phase rectifier, make up the three-phase rectifier R. At no load, the voltages across windings E and F are in phase with each other and the rectifier operates as a single-phase type. On application of load, a phase displacement between these two volt-



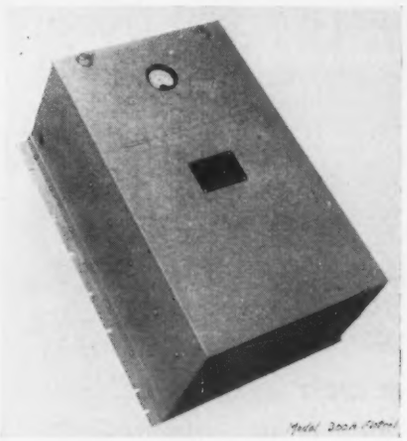


Fig. 108—Flotrol model 300-A constant-voltage battery charger of single-phase type with output of 12 amperes at 24 volts. Above—Closed view of cabinet model. Left—Open view.

Fig. 110-A—Floating and equalizing voltage curves of single phase Flotrol charger.

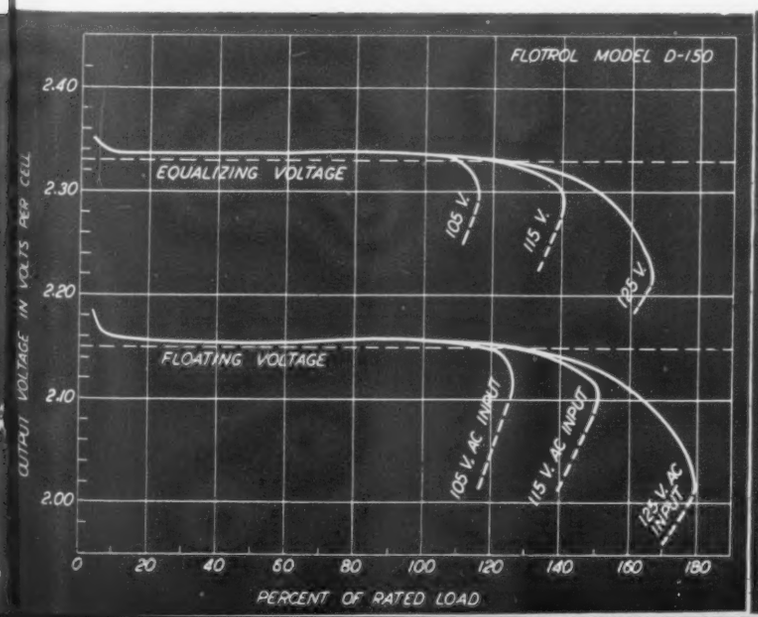
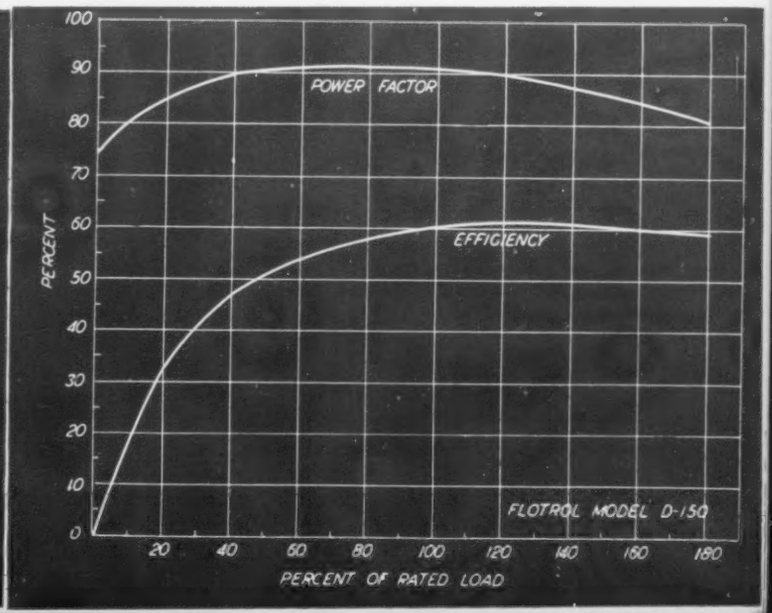


Fig. 110-B—Efficiency and power factor curves of single phase Flotrol charger.



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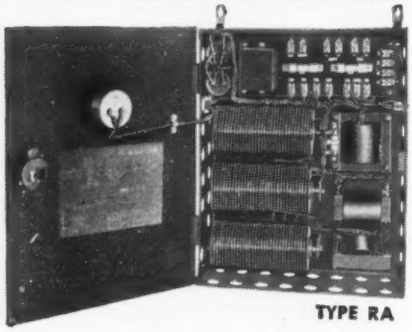

TYPE RA

The most economical telephone power supply is an Electrox Battery Eliminator

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*T.M. Reg.

RECTIFIER DIVISION
SCHAUER
MANUFACTURING CORP.

4516 Alpine Ave. Cincinnati 36, Ohio

ages occurs, and, as the load increases, the rectifier increasingly acts as a poly-phase rectifier. The resulting rise in output due to this transition corrects for the voltage drop through the rectifiers and the other circuit elements. The magnetic shunt D is properly adjusted at the factory to maintain this accurately regulated voltage throughout the range of load current for the life of the equipment.

Resistor R1 may be adjusted to compensate for aging of the rectifier and for the resistance of the charging leads. Inductance L smooths out the charging current ripple.

The charger has an equalizing switch, which, when operated, increases the output voltage from 2.15 volts to 2.33 volts per cell, as indicated in *Figure* 110 (a), with the same automatic control as for the regular connection, up to the full capacity of the charger.

As shown in *Figure* 110 (b), the losses in the control unit are very small. The full load efficiency is above 60 per cent, while the light load efficiency is approximately 40 per cent at one-third load, which is considered advantageous for central office battery installations where daily light-load periods are experienced. With normal line voltage, the unit will deliver 125 to 150 per cent of rated current, and on maximum input voltage, it can produce as high as 150 to 200 per cent of rated current with high efficiency.

Three-Phase Flotrol Charger

THE THREE-PHASE Flotrol charger (*Figure* 111) is fundamentally different in its circuit from the single-phase charger. However, a small single-phase unit is used as a source of reference voltage in the three-phase unit and together with saturable reactors, regulates the output voltage, holding it constant despite load and input voltage variations. The single-phase unit delivers generally less than 1 per cent of the total output of the three-phase charger.

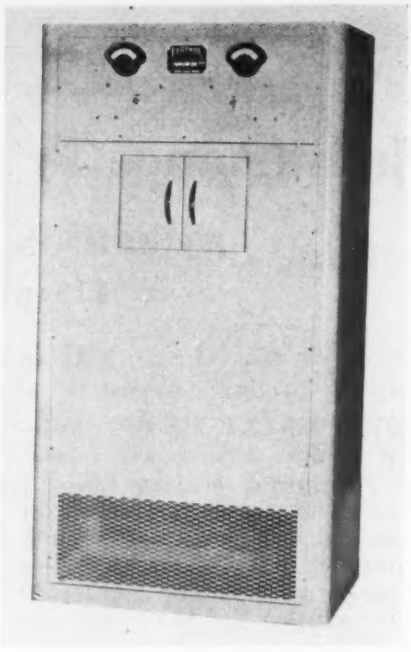

Fig. 111—Showing appearance of three-phase Flotrol Battery charger.

As indicated in the block diagram in *Figure* 112, the output of the reference voltage source is connected in parallel with the charger output through windings on the control reactors. When the charger voltage decreases below the reference voltage, current flows through the control reactor windings in the direction indicated by the arrow and restores the output voltage to normal. If the output voltage rises above normal, the current decreases and causes the reactors to increase the voltage drop between the insulating power transformer and the power rectifier, thereby bringing the output voltage of the charger back to normal. This action automatically compensates for the

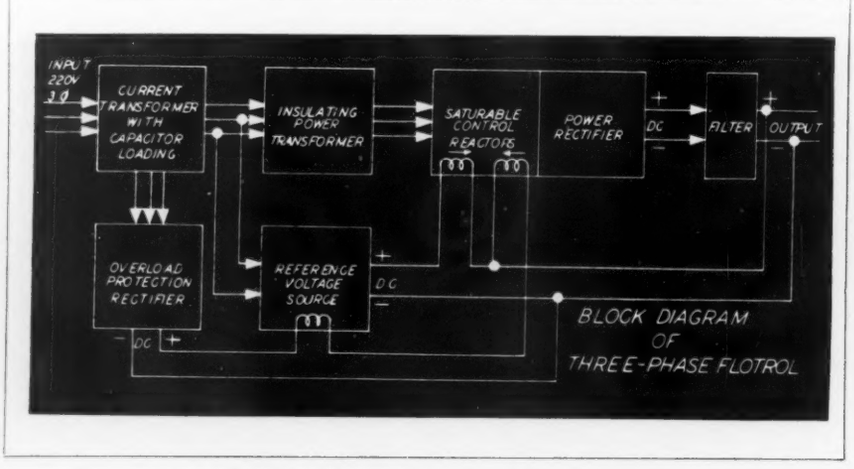

Fig. 112—Circuit of three-phase Flotrol charger.

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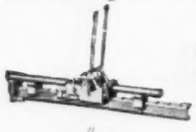

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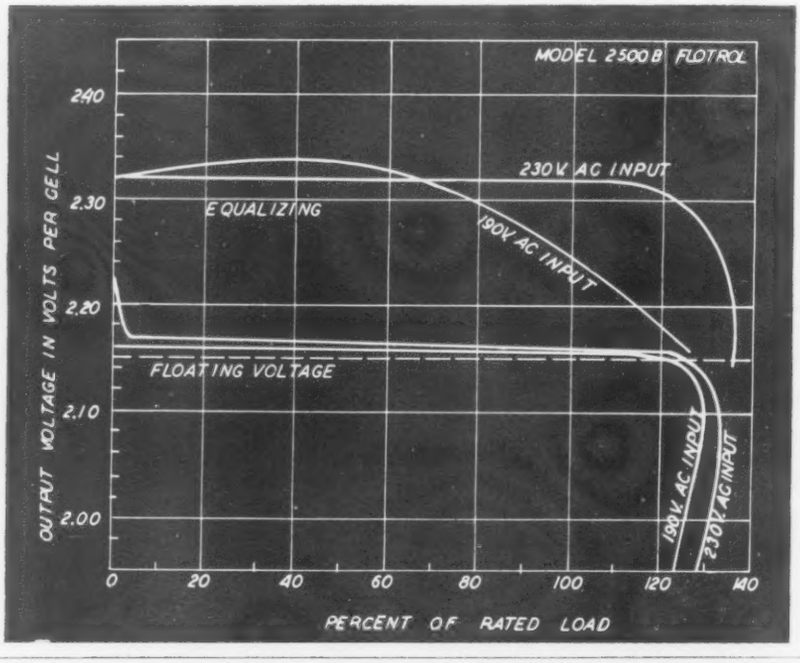
changes in input voltage, load current, and rectifier resistance. Voltage regulation curves of the three-phase unit are shown in *Figure* 113 (a).

A current limiting feature protects the charger against overloads. In case the storage battery is completely discharged, it is recharged at the maximum safe rate without damage to the equipment or tripping the circuit breakers in the unit. The current limiting equipment consists of current transformers loaded with capacitors and connected in series with the input to the power transformer. An overload protection rectifier connected to the secondary of the current transformers develops a voltage directly proportional to the load current. The output of this rectifier is connected in parallel with the output of the charger through control windings.

When the current delivered by the charger is less than a predetermined overload value, the voltage of the overload protection rectifier is less than the output voltage of the charger and no current flows through the rectifier circuit. As soon as the overload value is reached, however, the voltage



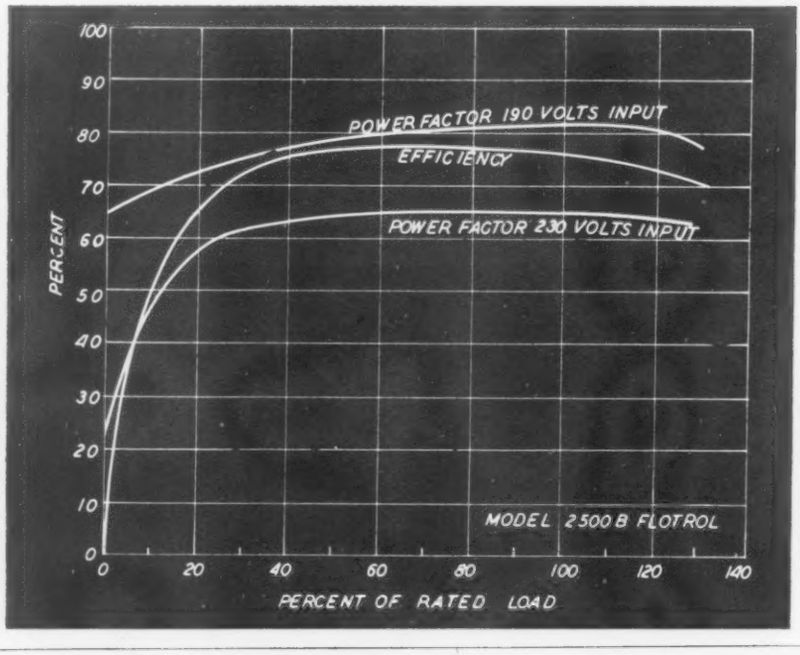
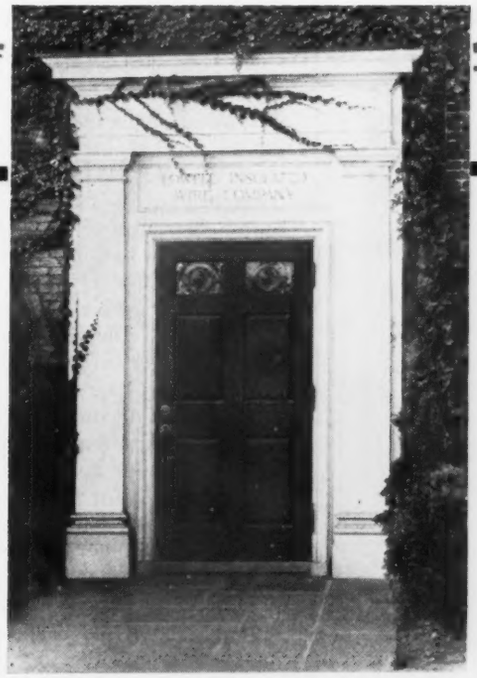


Fig. 113—Characteristic curves of the three-phase Flotrol charger. (a) Above—Floating and equalizing voltage curves. (b) Below—Efficiency and power factor curves.

LOWELL



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This

Engineering Manual for Long-Span Rural Lines

Pertinent and timely information on how to build long-span, low-cost rural lines of *Crapo* High-Tensile Telephone Line Wire is contained in this illustrated Engineering Manual. The book is designed especially to assist engineers and construction crews in extending and improving rural service.

The contents include electrical and physical characteristics of both *Crapo* HTL-135 and *Crapo* HTL-85 Line Wires; tables of stringing sags and tensions; recommended construction practices; information on guying, metalicizing and transposition, river crossings, etc.

If you have not received a copy of this Manual, be sure to ask for one! Direct your inquiry to your distributor of *Crapo* Galvanized Telephone Wire and Strand, or write us for Manual No. 203.

Crapo HTL-135 Telephone Line Wire possesses two and one-half times the strength of standard B. B. wire; makes practicable spans of 350 feet in heavy loading to 500 feet in light loading districts. *Crapo* HTL-85 permits spans of 225 feet in heavy loading, 375 feet in light loading districts.

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developed by the overload protection rectifier begins to exceed the output voltage of the charger and current flows through the control windings of the overload protection rectifier. This current decreases the output of the reference voltage source, which in turn reduces the output voltage. The same current flowing through the overload windings on the saturable control reactors increases the impedance of the reactors and further reduces the voltage to the power rectifier. This action limits the output current to 15 to 35 per cent above the rating of the charger. Thus, when the battery is in a completely discharged state, the charger will deliver from 115 to 135 per cent of its rated output current until the battery reaches its normal floating voltage as indicated in *Figure* 113(a).

Both the insulating power transformer and the reference voltage source are tapped to enable adjusting the output voltage of the charger to the number of the cells in the battery. An equalizing switch is provided to change the output voltage to a higher level for equalizing the battery. Aging of the power rectifier or changes of temperature of the saturable control reactors is automatically compensated for by changes in the output current of the reference voltage source, and it is not necessary to provide aging adjustments for the power rectifier in the three-phase section. The reference voltage section, however, has an aging adjustment to compensate for any unusual degree of the aging of the reference rectifiers.

The three-phase charger has a very high efficiency, ranging from 50 percent at 10 per cent load to 75 per cent at 40 per cent rated load and higher, as shown in *Figure* 113(b).

Two or more three-phase chargers can be operated directly in parallel for higher current output than possible with a single unit. It is even practicable to operate a d-c generator in parallel with a charger of the proper capacity. In this case the generator should be of a type having a drooping voltage characteristic and should not exceed the rating of the charger. The generator can be connected by automatic controls to deliver current whenever the charger rating is exceeded and to be disconnected when the current requirements are less than the current supplied by the generator alone.

(To Be Continued in the May issue of FORTNIGHTLY TELEPHONE ENGINEER. Part IX-B of this article appeared in the April FORTNIGHTLY TELEPHONE ENGINEER.)

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Anchoring efficiency depends a lot on how your anchors are installed. Hole sizes need to be exact for greatest holding power. The adjustable auger helps you bore them right. Proper expanding requires the right kind of expanding bar. Chance Line Construction Tools help crews do better anchoring and simplify pole setting operations. Consult your Chance Catalog. Order from your regular supplier.

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Death Claims Frank H. Woods and Hiland H. Wheeler

WITHIN THE SPACE of 43 hours, death claimed two key members of The Lincoln (Neb.) Telephone & Telegraph Company's official family. Frank H. Woods, founder of the company and chairman of the board, suffered a fatal heart attack on April 1. Mr. Woods was at his neighborhood polling place when felled by the attack. He was preparing to cast his ballot in Nebraska's prefer-

Frank H. Woods

ential primary election in which he was deeply interested. He had been actively engaged in supporting a "write-in" campaign during the month before the election. Mr. Woods was preceded in death by Hiland H. Wheeler, vice president of the company, who was competing in a reg-

(*Please turn to page* 100)

Hiland H. Wheeler

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Save time and cost on telephone line guying

Chance 8-way Expanding Anchors are the first choice of many users in the telephone industry. Reason? . . . They give more holding power for less money!

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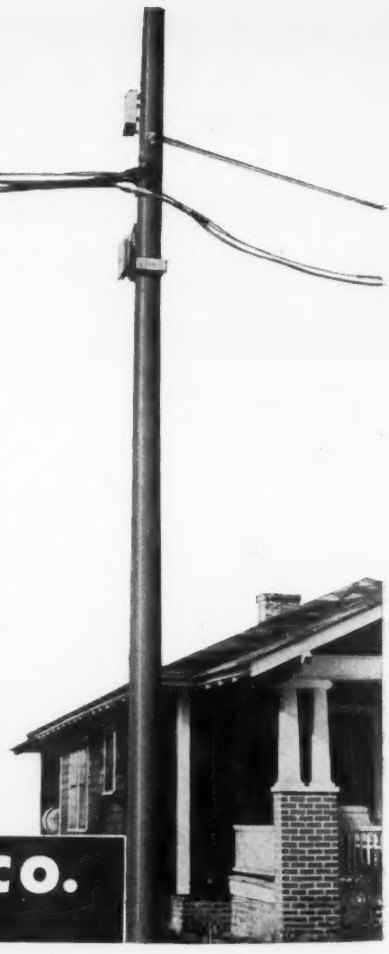

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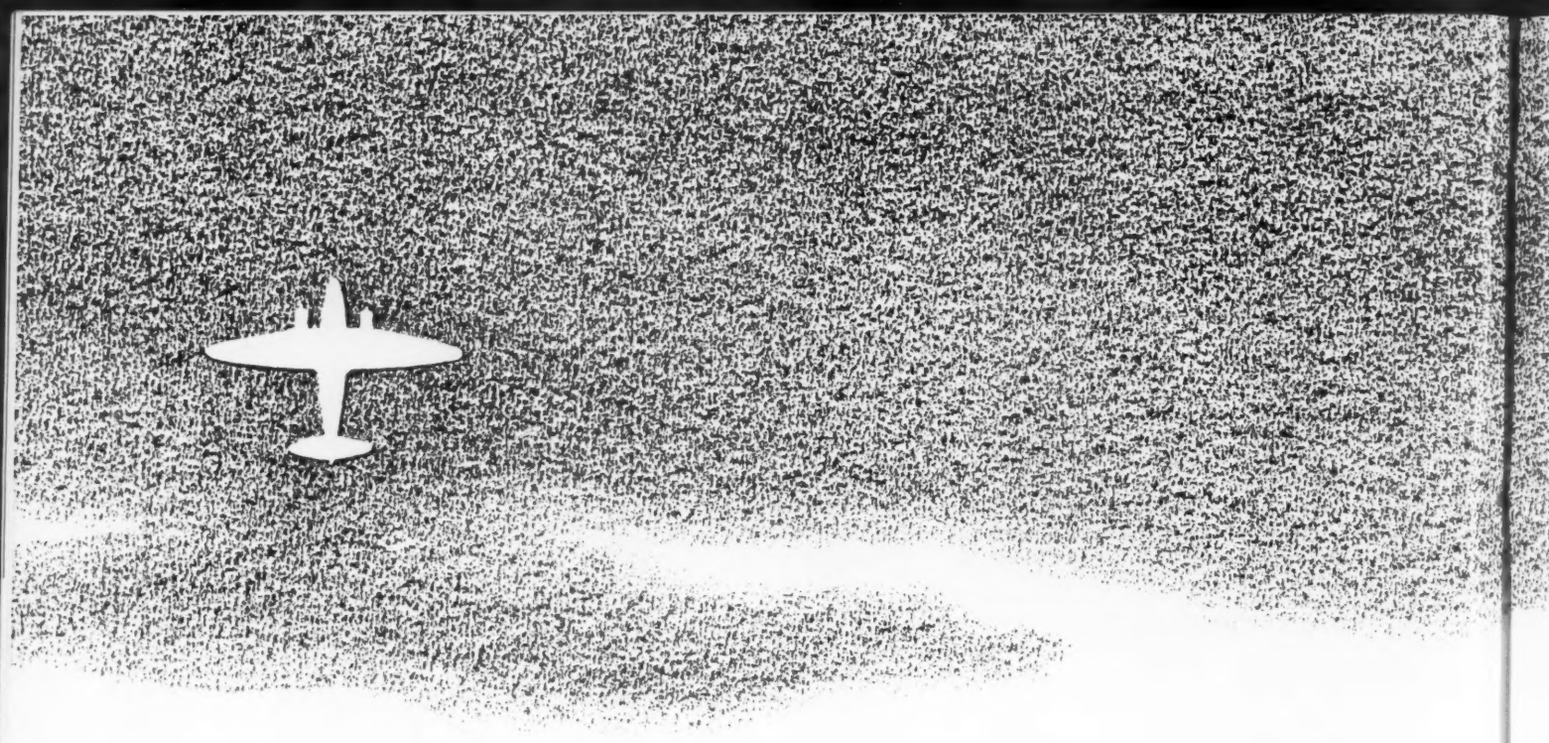


GOOD CITIZENS...ON AND OFF THE JOB

As lifesavers, telephone people have a high batting average. They are often called on in emergencies, and they have the facilities to reach help fast. Some of their acts of quick thinking and heroism make headlines. Many more pass unnoticed.

But their good citizenship goes beyond the calls of duty. In every phase of community life—church, Red Cross, civil defense, scouting, community chest—you find telephone people *living* the spirit of service they've made famous for themselves and for the telephone industry.

Millions of telephone users will read about a dramatic rescue from the clouds in the April national magazine advertisement shown on the opposite page.

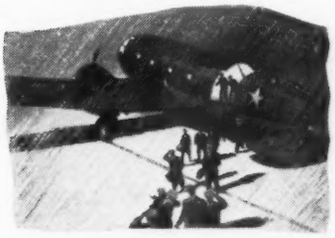
The Call that Saved a Plane

A heavy snow was falling in the winter darkness when Mrs. Lucille Wilson, night operator at Alamosa, Colorado, heard the sound of a low-flying airplane. It was well past midnight and Mrs. Wilson knew that the last scheduled airliner had gone over many hours before.

Then she heard the sound of the low-flying plane again as it circled back over the town.

A light flashed on Mrs. Wilson's switchboard. Soon as she said "Number please" an anxious voice said—

"This is Ralph Zook, dispatcher down at the railroad depot. Did you hear a plane? Didn't sound right, somehow. It's flying pretty low."



The landing lights were turned on and the big C-46 came safely to earth.

"I heard it, too," said Mrs. Wilson. "And there's no plane scheduled this time of night."

"That plane could be in trouble," said Mr. Zook. "We ought to do something about it."

"I'll try to reach someone to turn on the lights at the airport," said Mrs. Wilson. "Listen! There it is again! It's lost!"

Quickly Mrs. Wilson went into action. She called the airport, the government weather station, and a private flying service. But no one answered.

Then she reached Stamy Edmisten, an airline employee, at his home. He rushed to the airport and turned on the landing lights. A few minutes later a C-46 military transport loomed out of the snowstorm and came in for a safe landing. Thirteen men stepped from the plane, none the worse for the experience.

What could have been tragedy was prevented by quick-acting Ralph Zook and Stamy Edmisten and the alert, cool-thinking operator, Mrs. Lucille Wilson—one of about 650,000 telephone men and women guarding and serving America, twenty-four hours a day, in every kind of weather.

BELL TELEPHONE SYSTEM

Developments In Drop Wire Maintenance

(Continued from page 54)

of attachment on the house, it may be possible to run the drop wire down the pole in bridle rings to a lower point where the attachment can be made for passing the drop under the lower branches of the tree and thus obtain the desired clearance. This method is practicable only if the proper ground clearances are maintained for the drop span from the pole to the house.

Sometimes an installer is heard to remark that he likes to put up a nice flat span. That is the very thing to avoid, a flat drop span can only cause trouble. A drop span should have enough sag to prevent excessive strain on the wire at the attachments. Excessive stress in the drop wire is also a cause of the bail of the drop wire clamp wearing through on the drive hook and dropping the span. A drop span should be installed with not less than the minimum sags shown in the table below:

Span Length	Pole-to-Building Span	Pole-to-Pole Span
50′ or less	6″	
75′	12″	
100′	24″	18″
125′	48″	36″
150′	72″	48″
160′ to 200′	Greatest Possible Sag Limited by Clearance Requirements	

Because of the difficulty of maintaining minimum ground clearances, span lengths over 150 feet are not considered desirable. If spans over this length must be placed, they should have as much slack as possible with due regard for proper ground clearances. The wire sags indicated in the table are for the heavy loading district and can be reduced in the case of drop installations in the light and medium loading districts.

Drop wire clamps are installed as shown in *Figures 7 and 8*. Before pulling the sleeve and wire into position on the wedge, the wire sag is adjusted by pushing or pulling the wire through the sleeve which is held loose on the wedge with the thumb. When the sag has been adjusted to satisfaction, the sleeve should be pulled along the wire and wedge to clamp on the wire. To avoid future slipping of the wire in the clamp, the wire should be pulled up tight, or the wedge should be set up by tapping on its end with pliers to force it back into the sleeve.

The drop wire clamps in common use are designed for use on the saturated braid drop wire. In some cases, it may be found that the clamps do not fit well on the new type of drop wire due to the small size of the wire and its smooth finish, and the wire tends to slip in the clamp. This trouble can be remedied by using the so-called PS drop wire clamp which has a shim fitted over the wedge so as to provide additional bearing surface for holding the wire. Another type of drop wire clamp designed for the neoprene jacketed drop wire with cotton reinforcement uses a perforated shim which is placed between the sleeve and the wire for more effective holding and to prevent crushing of the wire insulation. When drop wire clamps are recovered and reused on the new types of drop wire, it is advisable to clean them thoroughly, especially on the inside, to remove bits of wax and asphalt from previous use on saturated braid drop wire. If this material is left in the clamp sleeve, it will cause the wire to slip in the clamp. Clamps to be reused should also be restraightened so that the wedge will work smoothly inside the sleeve.

In placing drop wire clamps it is desirable to provide a slack loop between two clamps or between the clamp and the "C" knob attachment on the building, as indicated in *Figures 4, 5, 8 and 9*. At the drop attachment to pole, guardarm, or cable

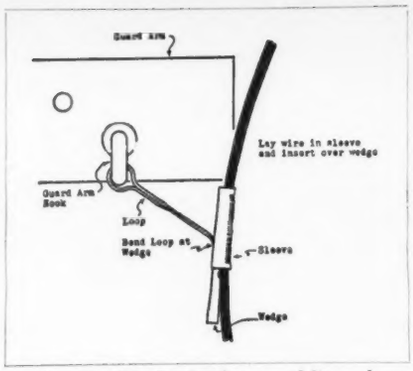


Fig. 7—Method of assembling drop wire clamp on drop wire.

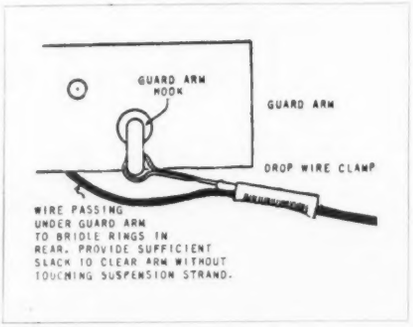

GUARD ARM HOOK
GUARD ARM
DROP WIRE CLAMP
WIRE PASSING UNDER GUARD ARM TO BRIDLE RINGS IN REAR. PROVIDE SUFFICIENT SLACK TO CLEAR ARM WITHOUT TOUCHING SUSPENSION STRAND.

Fig. 8—Drop wire clamp in assembled position. Note that drop wire is outside the guard arm hook to keep it out of the way of squirrels.

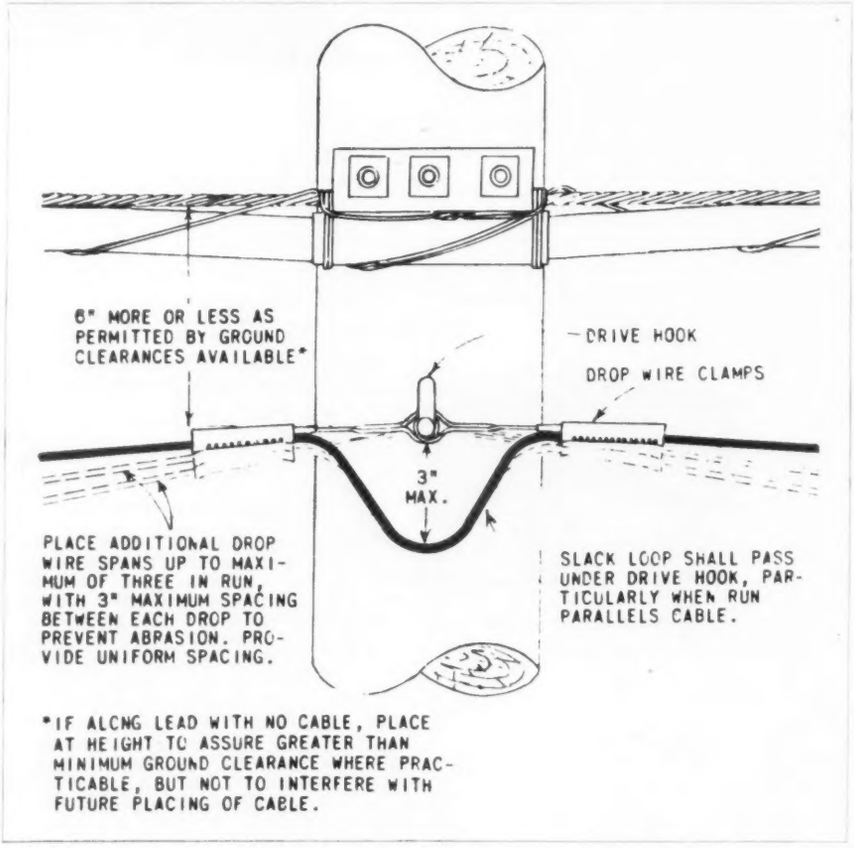

6" MORE OR LESS AS PERMITTED BY GROUND CLEARANCES AVAILABLE*
DRIVE HOOK
DROP WIRE CLAMPS
3" MAX.
PLACE ADDITIONAL DROP WIRE SPANS UP TO MAXIMUM OF THREE IN RUN, WITH 3" MAXIMUM SPACING BETWEEN EACH DROP TO PREVENT ABRASION. PROVIDE UNIFORM SPACING.
SLACK LOOP SHALL PASS UNDER DRIVE HOOK, PARTICULARLY WHEN RUN PARALLELS CABLE.
*IF ALONG LEAD WITH NO CABLE, PLACE AT HEIGHT TO ASSURE GREATER THAN MINIMUM GROUND CLEARANCE WHERE PRACTICABLE, BUT NOT TO INTERFERE WITH FUTURE PLACING OF CABLE.

Fig. 9—Providing slack loop in drop wire between drop wire clamps. Note provision of spacing between several drop wires in same pole-to-pole run to prevent abrasion of one wire upon another.

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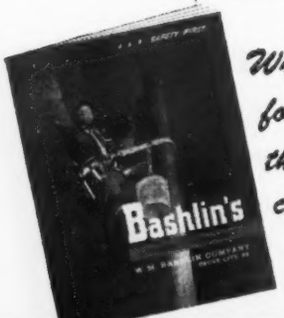

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suspension strand, the slack loop should be bent down to keep it out of the way of squirrels that seem to find the new drop wire insulation a tasty morsel for them.

When installing two or more wire spans close together as in a pole-to-pole run, it is desirable to space the drop wires apart about three inches between each drop to prevent abrasion of one drop on another. This arrangement is indicated in *Figure 9.*

Splicing Drop Wires

IT IS A WELL known fact that drop wires in a magneto exchange will remain in service for years without causing any kind of trouble until the insulation actually falls off or wears away and causes the bare wires to contact each other or ground. Even then the trouble can be remedied at least for a time merely by wrapping friction tape around the worn conductors.

In common battery or dial exchanges, any degree of wear or deterioration of the wire insulation will bring an immediate indication of trouble, such as noise, impaired transmission, opens or a permanent signal. This is due to the fact that each drop wire has battery standing on it at all times, and, as soon as a slight crack appears in the wire insulation, moisture will enter and cause a slight current to flow. This current exerts an electrolytic action on the metal in the conductors and creates

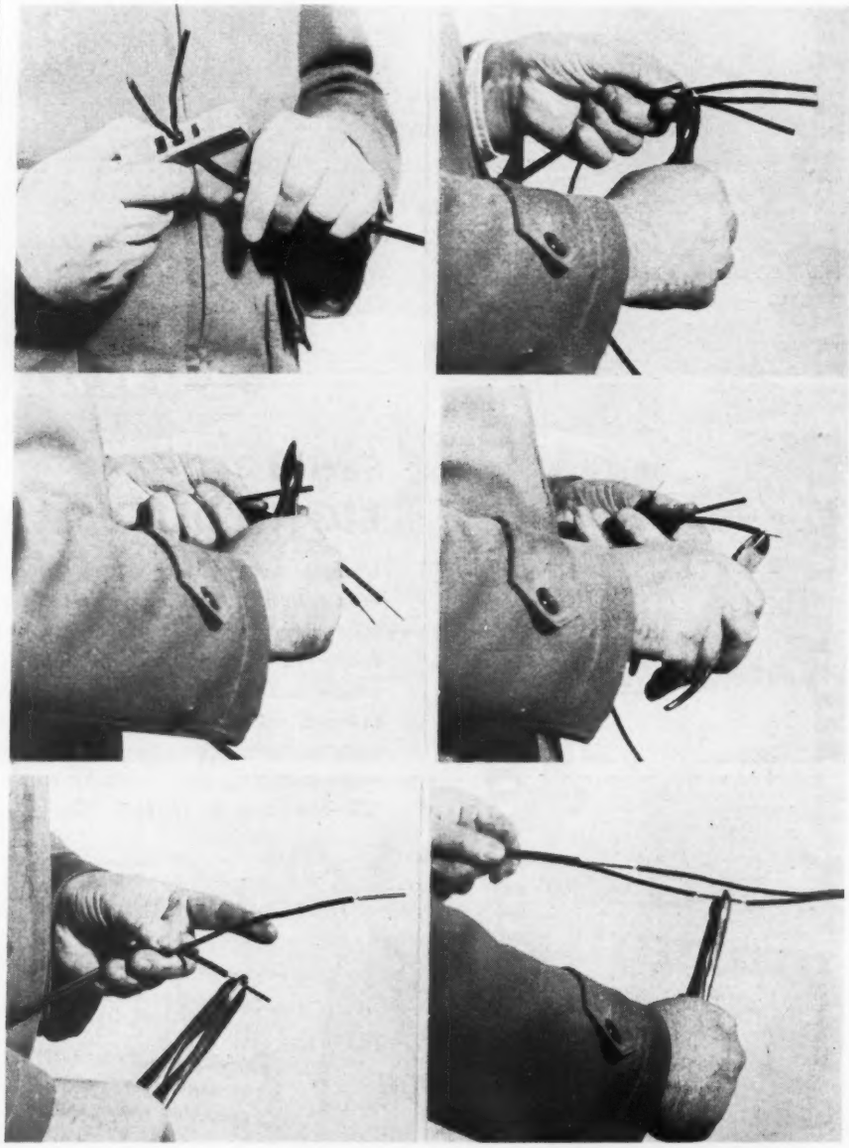

Fig. 10—Steps in splicing parallel drop wire. Upper left—Slitting Wire. Upper right—Matching wire ends and cutting off 3½" from tracer conductor on one pair and same amount from plain conductor on other pair. Center left—Crushing about two pliers widths of insulation in back hinge part of diagonal cutters. Center right—Removing insulation and scraping bare ends with cutters. Lower left—Crimping compression sleeves on conductor ends of one pair. Lower right—Joining conductors and crimping sleeves.

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(Continued from page 72)

salts of corrosion which improves the conductivity of the current path and produces an increased flow until the trouble becomes acute and service failure results.

It is quite obvious from the foregoing that ordinary repairs with friction tape alone will not do the job when the drop wire constantly carries direct current. While neoprene jacketed wire is not expected to cause trouble due to insulation failure, except in very unusual circumstances, there are cases when it is necessary to splice two drop wires together to prevent waste of good wire or to provide additional slack.

Friction and rubber tapes have been used with good results for insulating splices. However, friction tape will eventually deteriorate and expose the rubber tape to rapid destruction by sunlight and ozone. When used on splices in long-life neoprene jacketed wire, the splice covering may have to be renewed several times during the life of the drop wire, which may be expected to be 20 years. However, there are now various kinds of plastic tapes available which promise permanent covering for splices in neoprene drop wires. These tapes can be successfully used in warm weather, but some are difficult to handle and apply in cold seasons, necessitating the use of cold-weather tapes specially compounded for use in freezing weather.

Figures 10 *to* 12 illustrate the splicing procedure using compression sleeves and a self-bonding plastic tape which can be successfully applied in cold or warm weather. This tape is similar in appearance to ordinary rubber tape but has no adhesive surface. Instead, it makes use of a self-bonding characteristic which causes the tape layers to mold into a homogeneous mass within a minute after application. It is impervious to moisture and is unaffected by sunlight and ozone and can be exposed to the weather elements without deteriorating as long as it is not brought into contact with petroleum products like oil or gasoline. It can be used for both the conductor splices and the overall wrap, though friction tape may be substituted for the overall wrap if considered desirable for reasons of economy. In this case, after the friction tape weathers away, the BiSeal

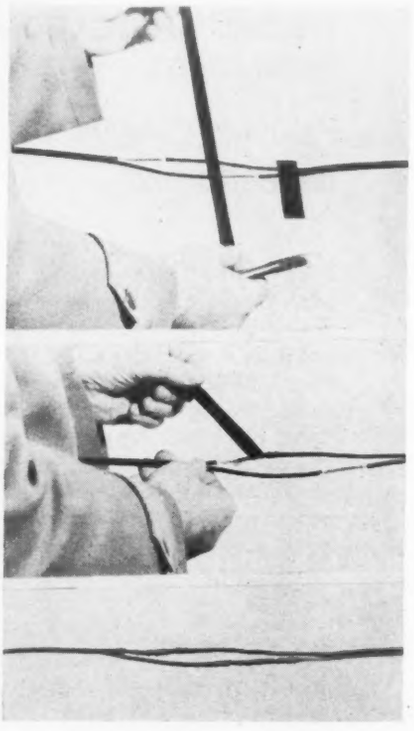
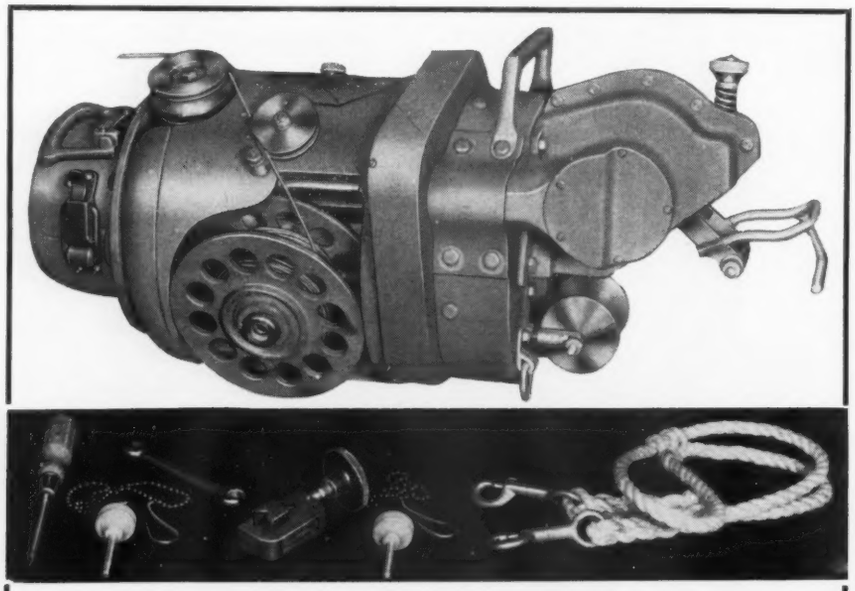


Fig. 11.—Steps in insulating individual splices with BiSeal self-bonding electrical insulating tape. Upper—Stretching 3″ piece to 3 times original length. Center—Starting in the middle and applying at least two layers to finish in middle of splice. Overlap tape at least ½″ over insulation at each end. Lower—Appearance of insulated conductor splices.



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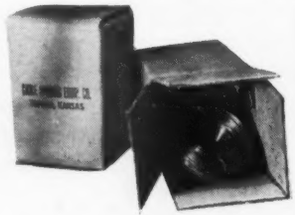

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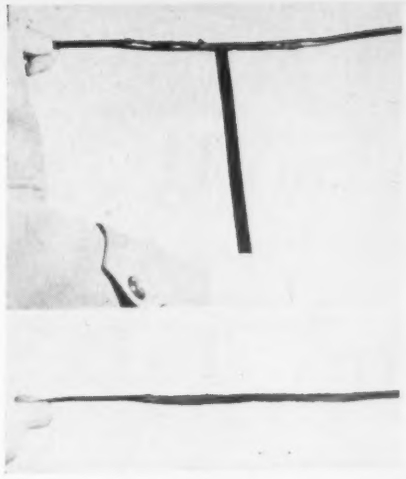


Fig. 12—Applying overall wrap of Bi-Seal self-bonding tape. Upper—Starting in middle between conductor splices, apply two layers overlapping about 1" beyond crotch of divided conductors at each end. Lower—Appearance of completed wrap.

tape on the conductor splices will remain unaffected and continue to protect the splices.

The long life characteristic of the new neoprene drop wires is already becoming evident in the lowering of the number of drop wire troubles commonly encountered. One company has noted a reduction of 25 per cent in its cases of drop troubles over a period of five years, and the trend is still continuing as the number of installations with the new type of wire increases.—THE END.

QUOTES

"The reason taxes seem high is because they are high. Back in the year 1900 the average person paid $3.88 in Federal taxes, while the average per person tax today is $472 according to the U.S. News & World Report. It isn't the high cost of living, it's the high cost of government."—*Le Sueur (Minn.), News-Herald.*

• • •

"The county treasurer's office . . . is crowded with citizens checking up and paying taxes . . . By a study of his statement the taxpayer can figure his exact contribution toward the administration of his city, which provides police protection, fire protection, upkeep of his streets, lighting, library, and various services . . . On the other hand the immense sums the Federal government whisks away from him are meekly surrendered . . . If the taxpayer raised half the howl . . . over the Federal extractions that he raises over the county pittance, the din might be heard, and have a wholesome effect in Washington."—*Arlington (Wash.) Times.*

Small Company Talk

By BILL CORMAN, Associate Editor

HI, NEIGHBOR: All around over my home state of Alabama, and equally so in every other state, I am sure, is abundant evidence of progress and growth in the Independent Telephone Industry. Almost every town you drive into now has a new pole line under construction, a new cable layout in the process of installation, a new building being planned, new central office facilities being cut into service, and so on. And a surprising number of them are either doing or starting in to do almost a complete new job—from scratch.

There is a considerable amount of personal satisfaction in this for me—it pleases me no end to see my chosen Industry growing, expanding, meeting its service demands, and making plans for an even bigger and better brand of telephone service. As a comparatively young man, it is undoubtedly natural for me to want to be a part of an Industry with a big and a bright future. And from where I sit, the future of the Telephone Industry is bigger and brighter right now than it probably has been for the past twenty or thirty years. I don't think I can deny that our problems are also much bigger and "better", but the opportunities to do and grow have always seemed more important to me than the problems accompanying such doing and growing. It is an old American custom that, given the all-important ingredient of opportunity, we can, will and do meet the problems as they come along.

And as one who is interested in the accounting problems of telephone companies, all this growth and development and renovation points out an important opportunity.

One of the prime objectives of a good telephone accounting set-up is accurate information on the plant investment. In many small companies, the accumulation of small but cumulative errors over a long period of years has rendered the value of the plant investment account practically zero. There is all sorts of evidence to support this statement. In most cases the plant value is fantastically low as compared to the figure any reasonable inventory would show. In other cases, the value in the Reserve for Depreciation is almost as high as the entire plant value. This results in a net value that is again fantastically low. In still other cases, the plant and depreciation accounts simply do not exist at all.

In countless articles and editorials, *Telephone Engineer* publications have pointed out the value of adequate records. Like the case of Perpetual Motion, the point has been proved as completely as anyone could wish. But the supposed difficulty of getting a proper set of records started and functioning has deterred many from actually digging in and getting the job done, and the lack of what seems a good starting point has been a good share of the difficulty.

There is no better time to start a proper set of records than when an extensive rebuilding of the telephone plant is about to take place.

The above sentence has been accorded a paragraph all its own, because it is the most important sentence in this article. From all sorts of viewpoints it is true. A rebuilding is a good time to start a new set of records, first of all, because more detailed plant cost information is at your finger tips, and covering a larger part of your total plant, than you have probably had in a long time. At the end of the rebuilding program, the chances are that a larger percentage of your plant will be new than at any time for a number of years into either the past or the future.

If a contractor is doing your construction work, the chances are that he will furnish you with detailed unit cost figures, because that is the way he gets paid—unit costs multiplied by the number of units installed. If you are doing your own work, you will have all the material invoices and labor cost in such close perspective that you can easily develop your own unit, and aggregate, costs.

In many such cases of reconstruction jobs, there has had to be some financing done, and the chances are that whoever you get your money from will have some definite ideas about what sort of financial information they will want from you in order for them to follow the progress of the loan. The information they will want is what you should have for your own profitable use anyway—even if they didn't require it—so here again is a golden opportunity for getting started on the job, and started right.

There is still another reason why this is a good time to start, and it is tied into the actual accounting processes involved in keeping accurate plant records. Stated in possibly its simplest terms, proper plant accounting involves two things:

(1) *Charging into* the plant accounts the applicable costs incurred by the addition of each unit of property to the actual physical plant.

(2) *Crediting out of* the plant accounts the cost, as it is shown in the books, of each unit of property which is abandoned, taken out of service or removed.

From the above statement, you can reason through to the following: Regardless of the accuracy of your present set of plant accounts, if you start doing the above two things, your

plant accounts will gradually and automatically become correct, and will arrive at the 100% correct stage when all of the property you had in plant, at the beginning of your proper plant accounting processes, has been replaced. In the normal course of events, this is a slow, even if sure, process. But when you do a big job all at once, or within a short space of time, the process is given a big boost along toward the 100% correct mark very soon after instituting the correct plant accounting procedures.

To illustrate the above, let us refer to a very simple example. Suppose that your entire telephone plant consisted of 100 telephone instruments —for the moment we are forgetting about switchboards, lines, cables, etc. Let's further suppose that you have these 100 instruments valued on your books at $100.00. This means that, as far as your books are concerned, your telephones are worth $1.00 each, which is one of those ridiculous figures we were talking about earlier.

At this point, you set up your proper plant accounting procedures, and each year for 10 years you replace 10 of the old telephones with new ones. And let us also suppose that you are able to buy your new phones for $25.00 each.

The first year you buy 10 phones at a total cost of $250.00. These are added to your plant account. You replace, during the year, 10 phones which you show on your books at $1.00 each—therefore you credit out of the plant account a total of $10.00. So at the end of the first year of doing your plant accounting correctly, your plant account now stands:

Value in Account first of year	$100.00
Add value of new telephones added	250.00
Subtract value of old telephones removed	10.00
Net value in Account end of year .	$340.00

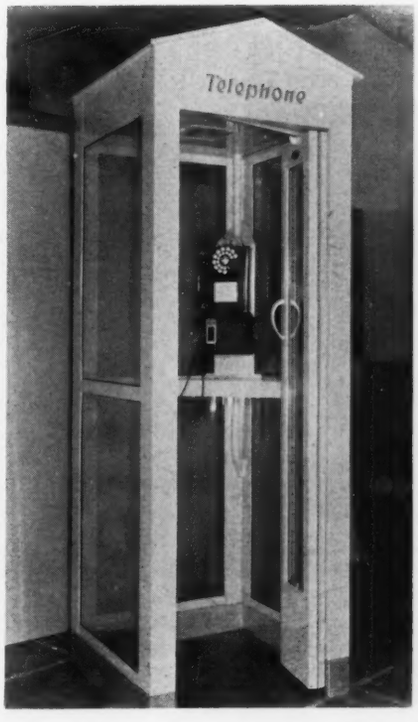
By a like process, at the end of five years the plant account would show a total value of $1,300.00 ($100.00 beginning value plus 50 telephones added at a cost each of $25.00 or a total of $1,250.00, less the value of 50 telephones retired at a value each of $1.00 or a total of $50.00).

And at the end of the 10 year period, the value in the account would be $2,500.00 ($100.00 beginning value, plus 100 telephones added at $25.00 each or $2,500.00, less 100 old telephones retired at $1.00 each or $100.00). And at this point the plant account is 100% correct. From the above example, it will be seen that, regardless of what the beginning value in the account may have been, and regardless of how much it may have been in error, the following of correct procedures will gradually correct the account. It is easy to follow it along from there to arrive at the conclusion that if a big share of the replacement of plant is done in a comparatively short period of time, the plant accounts will correct themselves that much more rapidly. For example, in the above illustration, if all 100 of the telephones had been replaced the first year, the plant account would have completely corrected itself in that one year.

There are also a good many other reasons why the extensive reconstruction program is a good time to start a good set of books. One is that many times a rate increase is a necessary part of the reconstruction, and if you can show the commission that you are setting up the processes that will give them accurate information they will be much more likely to lend you the otherwise hard to get "sympathetic ear."

So, Neighbor, think it over—this new reconstruction program of yours provides you with a very nice starting point for that "good set of books."

"Outdoor Paystations Pay . . . ."



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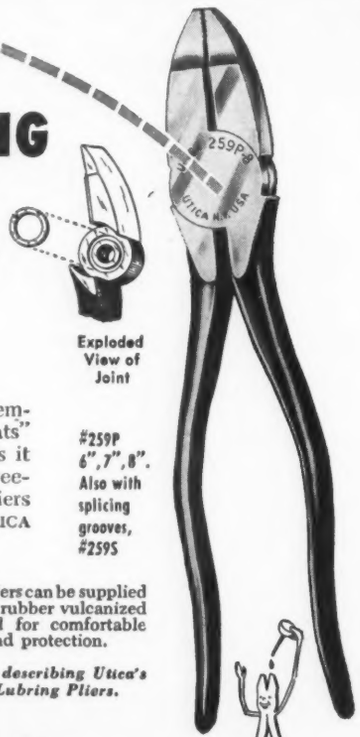

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Clearing Right of Ways

(Continued from page 41)

in dormant season spraying, much of the material enters through the stem. Since water alone is not effective as a carrier for these chemicals during the dormant season, fuel oil, kerosene, or similar oils are commonly used. Some oil and water emulsions have given encouraging results. If effective, these emulsions would reduce the cost of the spray mixture by eliminating up to 80 or 90 per cent of the oil and thus solve the problem of obtaining oil in sufficient quantities for the spraying operations. Emulsions, however, may be an inconvenience during periods of

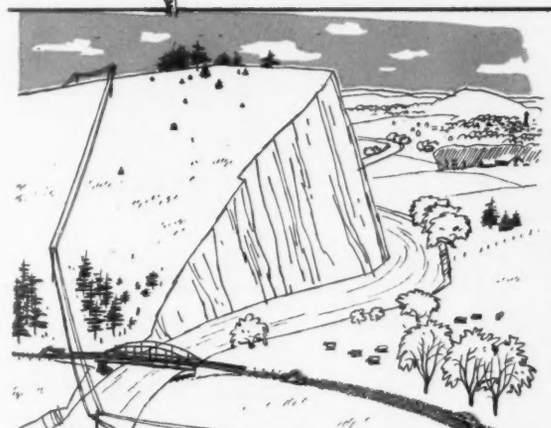
Using Homelite High-cycle electric chain saw to cut large limbs on standing tree.

alternate freezing and thawing, due to ice particles in hose lines and nozzles. Under conditions of varying temperatures, it would be necessary to drain the pump and hose lines frequently.

When the foliage spraying technique is employed, the herbicide is mixed with water in the proportions specified by the manufacturer. The mixture is sprayed over the entire area of trees and brush. This requires the use of high power sprayers in order to throw the spray high enough to completely wet the foliage on trees and high brush. Boom type sprayers can be used for low brush, but many companies prefer single nozzle sprayers that can be directed as required for complete coverage. Spraying may be handled from the truck carrying the spraying apparatus, but less material is wasted and better coverage of the woody plants is obtained when the spray operators move through the brush with the hose lines and work from the field side and then from the road side of the right of way. In this manner, each plant is sprayed

(Please turn to page 80)

CHECKING THE LINE... via GraybaR



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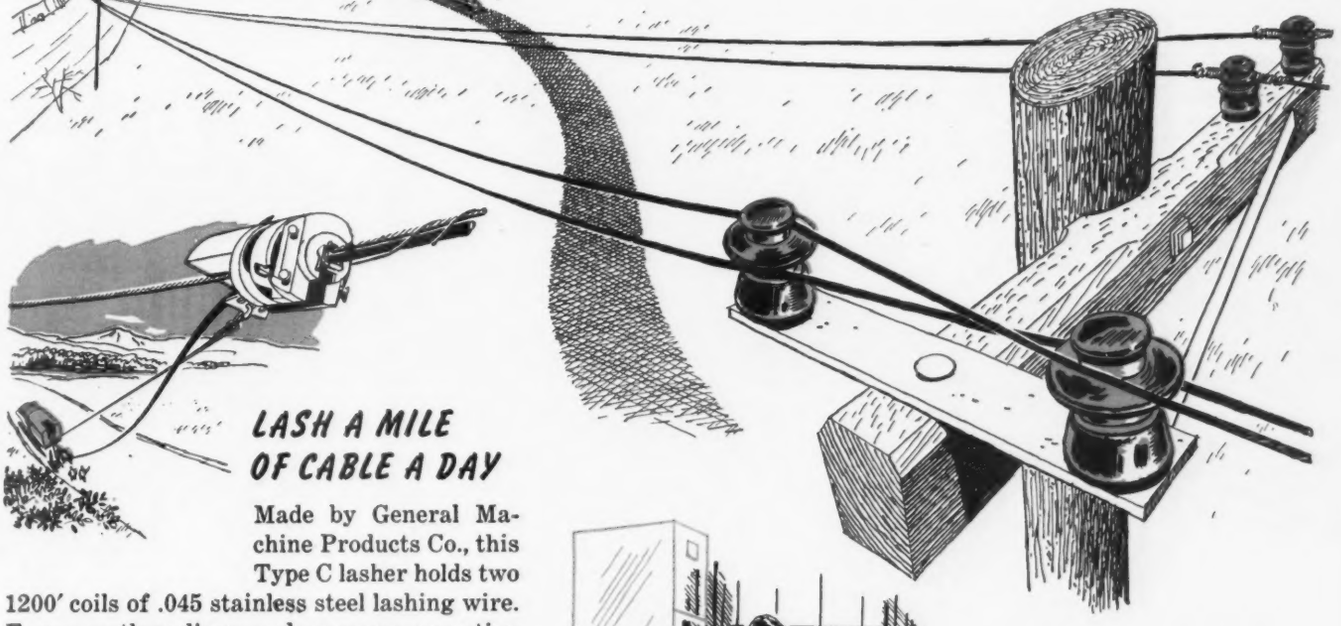

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(Continued from page 78)

from the bottom up to the top and very little foliage area is missed.

Foliage Spraying

FOLIAGE SPRAYING gives the best results in the summer months, generally between the time the woody plants are developing full leaf and shortly before frost time in the fall. This short period for spraying right of ways is one of the disadvantages of the foliage spraying technique.

Another disadvantage of this spray-method is that high pressure is needed to throw the spray to the required height. This creates a mist that drifts with the wind and may damage farm crops or ornamental and fruit trees on private properties abutting the right of way. Spray drift can be reduced by using only sufficient pressure to produce the desired coverage. When there is any possibility that damage may be caused by spray drift, it is better to employ another and less risky method of eradicating the woody plants on the right of way near the area in question.

Dormant Season Spraying

DORMANT SEASON spraying does away with some of the difficulties encountered with foliage spraying and extends the spraying season over most of the year instead of confining it to the growing period. This brush control method is safer to use in areas where the spray drift incidental to foliage spraying might damage adjacent sensitive crops. It enables the use of trained crews and equipment which could otherwise be employed only during the summer months. This extension of the spraying season enables more right of ways to be sprayed in any one year.

In the dormant season spraying procedure, the proper proportions of herbicide and fuel oil are mixed in accordance with the manufacturer's directions. The mixture is applied directly to the woody plants with the proper spray equipment or knapsack sprayers. Where the brush is over three feet high, only the basal portion of each plant is sprayed, the height of coverage varying from 12 inches to 30 inches according to the manufacturer's specifications. Although the height of coverage is not too critical, the important thing is to thoroughly wet the basal part of each and every plant all around the stem. Sufficient spray material should be applied to cause run off of the fluid into the ground line of the stem. This precaution will prevent incipient buds under the bark from developing into sprouts. Incidentally, satisfactory results may not be obtained from this spraying method if snow covers several inches of the basal portions of the woody plants and prevents thorough spray coverage from the ground line up. Some companies "frill out" trunks of large trees at the base to

(Please turn to page 82)

Removing limbs from felled tree with Homelite gasoline engine powered chain saw.

Using jet-type sprayer to spray brush on private right of way. (Dow Chemical Company Photo.)

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Many Planté batteries are still in active full-float service after twenty, thirty, even forty years! That's because Planté plates are heavy, solid sheets of pure lead. In these batteries Gould has eliminated the primary cause of self-discharge, capacity losses and shortened battery life. Cut maintenance, charging and replacement costs to a minimum. Choose Planté.
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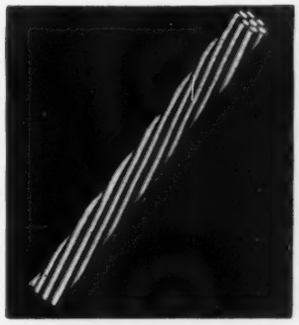

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New "325" Attachment . . . Derrick and Digger Unit

For 3/4 and 1-TON TRUCKS

Now your regular telephone service truck can be put to the added use of pole setting. Normally it will take two men less than ten minutes to set up the derrick, attach the digger, dig the hole and set the pole—all ready for tamping. It's all accomplished with the Model 325 Derrick and Digger Attachment, made to fit all service trucks as illustrated.

★ Answers the need for a two man construction crew

★ Sets poles up to 35'; takes augers 8" to 20" diameter

★ Packaged unit for installation by your local mechanic

Write for fully illustrated Bulletin 325.

TEL-E-LECT PRODUCTS, INC.

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(Continued from page 80)

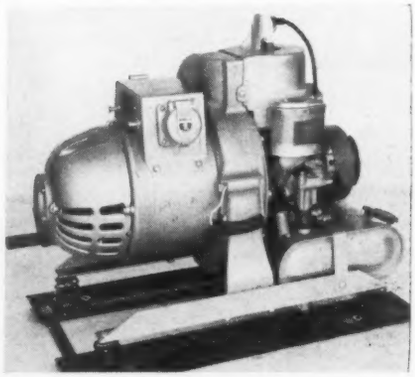
ensure translocation of the herbicide to the root system of the tree.

The dormant spraying technique described is also referred to as basal stem or basal bark chemical control. This method also may be employed where trees have been cut down and it is desired to prevent resprouting from the stump. The herbicide and oil mixture is applied over the cut area of the stump and all around the stump from the ground line up until run off occurs.

Dormant season basal spraying operations need not be confined to the winter months but may be carried on during the summer, using the same proportions of herbicide and oil carrier. Its practical use, however, will probably be more or less restricted because of the difficulty involved in working through heavy brush foliage and dense stands of weed to properly apply the spray material. This would reduce the efficiency of the spray operators and increase the spraying costs. For this reason, some companies prefer to use high volume sprays with water carrier in the summer operations and switch to the dormant season spraying work in the winter time. In this case, summer basal sprays would be employed in spot spraying of resistant species in right of way areas previously worked over by spraying crews.

A satisfactory kill is obtained when the brush is treated any time after the sprouts become dormant. Some authorities believe that fall treatments give better results than late winter applications, while others take the opposite view. Nevertheless, satisfactory brush control has been obtained by the dormant season spraying method at all times of the year.

The equipment for dormant season spraying can be quite simple. For extensive work, a 150-gallon tank mounted on a trailer with



Homelite Model 24 2500-watt generator with 6-HP gasoline engine for heavy duty portable service.

a gasoline-engine driven pump of the reciprocating type may be employed. The tank should be equipped with baffles and a paddle type agitator operated by the gasoline engine to keep the mixture thoroughly stirred. About 100 feet of ½-inch hose line and a long handled spray gun will enable the operator to work in the brush along the right of way.

When spraying is something of a part-time project, it is more economical to use smaller spray equipment. For this purpose, a 6-horsepower gasoline-engine driven centrifugal pump with 55-gallon drum for the supply tank would be about right. This equipment has a by-pass agitator to keep the spray material well-mixed.

Although dormant season spraying is safer than foliage treatment, due to the fact that sensitive annual crops are not present during the winter season, the spray mixture may injure valuable trees and perennial plants in properties adjacent to the right of way unless care is taken to prevent spray drift. To reduce spray drift to a minimum, the sprayer pump should be adjusted to deliver about 20 to 40 pounds pressure at the nozzle and the proper type of disc should be used in the nozzle to produce a coarse breaking spray with little or no fog.

The effect of the dormant basal stem spraying is to cause the death of small brush by midsummer following the spraying operation. Trees and tall brush, however, will react more slowly and usually will form leaves in the spring, only to gradually die a few weeks later. Some trees may form a large number of sucker growths, indicating rapid loss of vitality, or will fail to shed their leaves for a time. These trees will die sooner than others that lose their foliage almost immediately following the treatment. The dying condition of the trees is indicated by loosening and splitting of the bark, mostly in the basal area and disintegration of the sapwood, even though leafing is noted for a time. Although most woody plants are killed by the chemical treatment, a few resistant species will continue to live. They can be killed by retreatment the following year, using knapsack sprayers to apply the herbicide. Because of dormant seeds and plants just starting their growth at the time of the first spraying, the right of ways should be resprayed in six or seven years. It may be more economical, however, to provide combination men with knapsack sprayers and instruct

(*Please turn to page* 84)

ALPHADUCT DROP WIRE

carton packaging

saves you time and money

- easier to handle
- easier to inventory
- stacks neatly, saves space
- saves workmen from injury
- prevents wire from being crushed

Once you start using Alphaduct Drop Wire you will find out that the handy carton packaging has real dollars and cents advantages.

Not only does your wire arrive in perfect condition, but the sturdy carton protects it all the while it's in your warehouse.

The cartons are easier to handle than loose coils. They can be stacked higher without danger of falling and the wire on the bottom will not be crushed or bent. Space is saved, inventory taking is simplified, and the possibility of injuries to workers from tumbling coils is removed.

We try to make Alphaduct the finest, longest lasting drop wire money can buy. Quality materials are used throughout, step-testing during every phase of manufacture assures uniform high standards. Alphaduct drop wire is dated with a color coded thread so you can tell for sure how long it lasts.

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ON ANY TYPE OF TELEPHONE CORD GO

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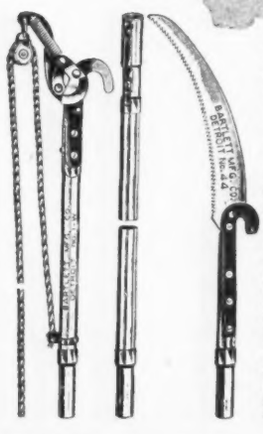
AND YOU'LL GET

ECONOMY · QUALITY · SERVICE

COMMERCIAL CORD AND SUPPLY CO., INC.
26 EAST MAIN STREET CLIFTON SPRINGS, N. Y.
PHONE—CLIFTON SPRINGS 189 · WRITE FOR SAMPLES AND QUOTATIONS

Tree Trimming Days Are Here!-
Use BARTLETT
for ease of operation and
protection to the operator



This Tree Trimmer has Compound Lever side cutting head and double leverage due to the pulley which is attached to the curved lever. It will sever any branch up to 1¼" in diameter with the slightest effort. For larger limbs we recommend our No. 44 Pole Pruning Saw with 16" blade.

WE combination Pruner and Saw can be quickly assembled to make either: 1 Heavy Duty Tree Trimmer (1¼" capacity) or 1 Fast-cutting pole saw. Total weight is 8 lbs. Easily carried in small car.

No. 124-B SAW.
This curved blade, draw cut saw is ideal for all-around pruning. Best quality saw steel.

BARTLETT Tree Paint
Our Tree Paint is universally used after pruning to destroy and prevent growth of wood destroying fungi.

BARTLETT MFG. CO.
3052 E. Grand Blvd. Detroit 2, Michigan

(Continued from page 83)

them to spray small live plants that they see growing under telephone open-wire lines in right of ways along minor roads. They should, however, avoid doing any spraying in areas under the control of state road authorities.

In applying herbicides by foliage or basal bark spray to kill trees, it is advisable not to treat trees growing higher than the line conductors, but rather they should be cut down and the stumps treated to prevent resprouting. This will avoid leaving dead trees to eventually fall across the lines wires or drop broken branches on the wires.

As to the question of spray operators requiring protection from the spray material, the herbicide is not poisonous to humans. The oil mixture, however, may damage clothing, especially shoes, and it is desirable to have the workers wear protective clothing and boots. Neoprene impregnated overalls or aprons will provide protection from direct contact of the mixture with the clothing.

Another method of applying chemicals, airplane spraying, has been successfully employed for treating right of ways where spray drift will not damage valuable crops or trees. This method is well suited for dense overgrown hedgerows that would be difficult and tedious to spray by other means. A much heavier concentration of the herbicide in oil or oil-water emulsion is required with spraying at the rate of 5 gallons per acre. Spraying by airplane should not be attempted when the air velocity exceeds 10 miles per hour.

Power Saws in Line Maintenance Work

WHEN EXTENSIVE trimming of trees is needed for adequate wire clearance, electric-motor or gasoline-engine powered chain saws are a practical and economical means of cutting away large interfering branches. If large trees are to be removed from the right of way, the use of these power saws will greatly speed up the work. After the trees are cut down they can be sawed rapidly into cord lengths for the farmer to haul to his woodpile. With present high labor costs, power saws will soon pay for themselves.

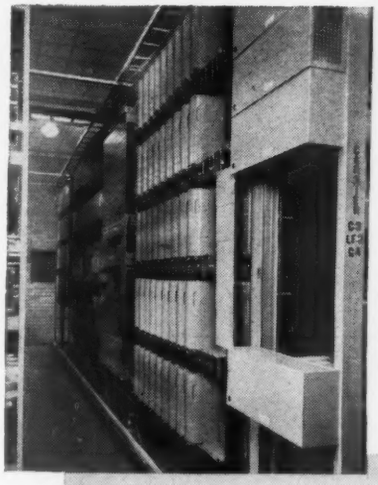
The gasoline-engine powered saw illustrated on these pages uses die cast magnesium and aluminum alloys to provide maximum strength with minimum weight. This unit has a 4-horsepower engine and weighs only 27 pounds when equipped with 18-inch saw. An automatic clutch en-

(Please turn to page 86)

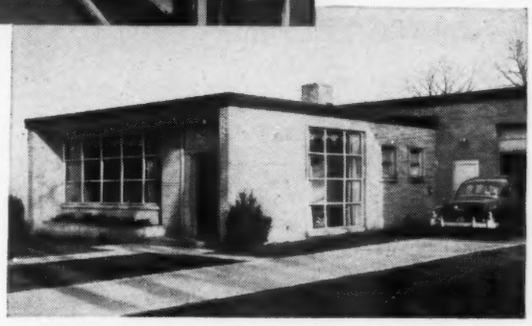
GIRARD, Pennsylvania

cuts over *Federal* STEP-BY-STEP Dial Switching Equipment

President Lewis F. Shepherd, Pennsylvania Telephone Corporation, putting through first call at Girard cutover. In the photo—left-to-right: Albert A. Dunbar, Erie Business Office Supervisor and Theodore J. Schuler, General Plant Superintendent, Pennsylvania Telephone Corporation; E. J. Hart, Federal Telephone and Radio Corporation; Lewis F. Shepherd; Frank D. Reese, Acting Chief Engineer; Frank D. McCarthy, General Commercial Superintendent, and Donald S. Parsons, Erie District Plant Superintendent, Pennsylvania Telephone Corporation.



Partial view of Federal carrier, connector and line-finder bays installed at Girard exchange.



Compact, modern building is attractive center of Girard's new telephone service.

Another PENNSYLVANIA TELEPHONE CORPORATION exchange converts to Federal Step-by-Step with 750 lines and 1600 terminals supplying modern unattended, completely automatic telephone service.

AT MIDNIGHT on March 29 another of its growing list of Federal Step-by-Step dial exchange cutovers was successfully completed by Pennsylvania Telephone Corporation. 750 lines and 1600 terminals were placed in unattended, automatic dial service at the Girard, Pa., exchange, a satellite of Erie, Pa. The new Federal installation provides free service to another Federal Step-by-Step exchange at Fairview, and toll trunks to Erie as well as to other independent telephone companies at Albion and West Springfield. The installation includes a one-position local and toll test board.

The cutover at Girard to Federal equipment marks another important improvement in one of the nation's finest and most modern independent telephone networks.

Federal offers attractive delivery dates on its complete line of telephone switching equipment for any size exchange—equipment backed by 69 years' experience in telephone development. For details, write to Telephone Sales Department.

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Federal Telephone and Radio Corporation

100 KINGSLAND ROAD, CLIFTON, NEW JERSEY

In Canada: Federal Electric Manufacturing Company, Ltd., Montreal, P. Q.
Export Distributors: International Standard Electric Corp., 67 Broad St., N. Y.

FEDERAL TELEPHONE & RADIO — FTR — An IT&T Associate

(Concluded from page 84)

ables the saw to be started or stopped by pressing or releasing the throttle without stopping the engine itself.

The electric chain saw also pictured is designed to be operated from a 110-volt 180-cycle generator. The use of a higher frequency rather than the customary 60-cycles results in a smaller motor with simpler and more rugged parts and higher power than standard a-c or universal type motors. The generator has an output of 2500 watts and is driven by a 6-horsepower gasoline engine. The generator also has outlets for plugging in floodlights and standard electric power tools.

Both the electric and gasoline powered saws have an efficient chain saw with narrow kerf which produces fast cutting action and less danger of binding in the saw slot. An unique feature is a spiked bumper plate that grips the wood and acts as a pivot for the saw as the chain cuts into the wood. This reduces the effort required to hold the saw in position while cutting and makes the work much easier for the operator.

Chain saws with universal type motor are available for use with standard 110-volt 60-cycle gasoline or diesel engine generators used for emergency operation of small central office power plants during power failures.

The eradication methods outlined in this article are well suited for preliminary clearance of right of ways in rebuilding telephone open-wire leads. Chemical eradication is probably the cheapest method as compared to hand cutting and bulldozing, but even then it requires a rather considerable money outlay at the start. However, as a long term investment in security against troubles due to tree contacts, it is worthwhile. After the initial and follow-up treatments, the six to seven year maintenance treatments will be quite inexpensive, particularly in view of the fact that 70 per cent of the average exchange maintenance expense is due to tree trimming costs which are repeated every trimming cycle of two years.—THE END

QUOTES

"We wonder what George Washington would have to say about some of the actions that take place these days in the city that bears his name? Washington was dedicated to the service of the country he helped to establish and to the welfare of his fellow Americans. He was not concerned with entrenching himself in office." ***Altoona (Pa.), Mirror.***

• • •

" 'On the Brink of Socialism' is an editorial feature which appeared in last week's issue of Collier's Magazine. In the large picture at the top of the page is shown a view of Niagara Falls. Just at the brink of the falls and pulling on the oars of a small rowboat with all his might is a man who evidently represents the general public or 'Private Enterprise.' " ***Bishopville, (S. C.), Messenger.***

• • •

"You might get an idea of the hugeness of a billion if you realized that since the birth of Christ more than 1900 years ago, just slightly more than a billion minutes have elapsed . . . If you take a look at the President's proposals further, you will see that he wants to spend more dollars in the next fiscal year than there have been seconds between the birth of Christ and the present time."—* ***Hillsboro (Mo.) Record.***

Homelite High-cycle electric chain saw used in emergency removal of fallen tree. Note floodlights operated by same generator that furnishes power for the saw.

Construction M
With the Double
and America's
the new cane seat
is cooler - cleaner -
more comfortable...

sturgis SC-240
Literally "by request"—this new operator's chair retains all the posture advantages for which Sturgis is famed and adds the cool, clean comfort of a *cane* seat. The posture-curved, well-cushioned back rest is covered in genuine leather.
The exclusive Sturgis "Follow-Flex" feature automatically adjusts to the operator's every movement, supports her restfully all the time, discourages fatigue, keeps her at top efficiency.
Other new and welcome features include a plastic-coated steel foot ring which retains its color and a handy purse holder, available on request. Six seat heights, all adjustable.
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TELEPHONES, SWITCHBOARDS • SOUND

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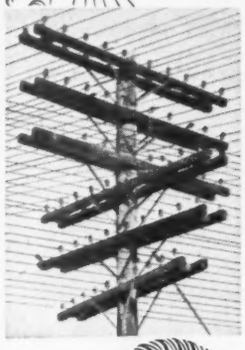
Guarantee of Stromberg-Carlson Leading Manufacturers . . .

"dependable" *means both the trade-mark & the guarantee of cross-arms by*

American Cross-Arm Inc.



The finest pole and wire installation is useless if cross-arms fail. "Dependable" Cross-Arms are all that the name implies—made of sturdy, American woods, long seasoned, fashioned and finished to stand every weather condition from desert heat to mountain blizzards.

In Douglas Fir—Creosoted Yellow Pine or Gulf-Red Cypress.

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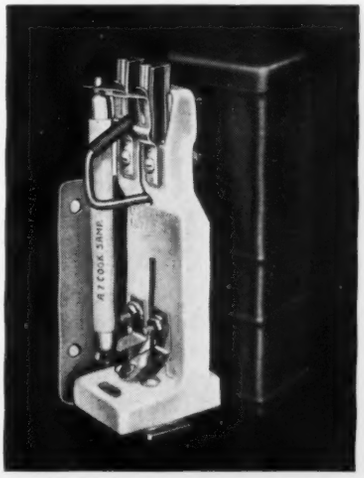
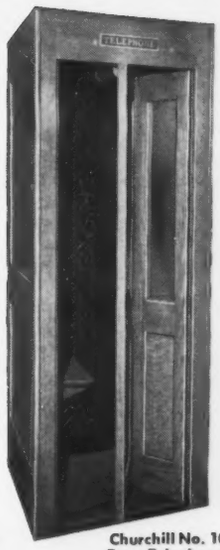
This single circuit protector, equipped with fuses and lightning arresters, is unexcelled for either indoor or outdoor use. Special Cook-engineered features include:

1. Heavy white glazed porcelain designed to prevent surface leakage between current-carrying parts.
2. Tru-Gap high-potential dischargers that will not ground the line.
3. Phosphor bronze fuse and arrester springs, zinc hood, Everdur studs and washers. Hood is grounded when in place.
4. Choice of types and lengths of Cook Telephone Fuses.





Churchill No. 100 Folding Door Telephone Booth

The

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. . . reduces overhead by increasing revenue

Users appreciate the comfort and quiet privacy afforded by the Churchill No. 100 Folding Door Telephone Booth. Operating companies enjoy increased pay station business.

Constructed as a single unit and equipped with a reinforced back panel for mounting a wall telephone or coin collector. Included as standard equipment are electric light and automatic electric ventilator.

Available in two finishes:

No. 100-A: Selected white oak, in light medium oak satin finish.

No. 100-B: Birch, mahogany finish.

Overall height, 84¾"; width, 30½"; depth, 30½". Shipped knocked down and crated.

Illustrated literature available.

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Yes, safety and service are the two big reasons why Kleins are the choice of the man on the pole. Look for the familiar Klein trade-mark on pliers and climbers, safety straps and belts, lag wrenches and grips. It has been a trade-mark of quality "Since 1857."

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(Continued from page 37)

perience they learn to buy only the best, for the simple reason that it is the cheapest thing to do in the long run. Such tools are naturally very expensive and many a workman has groaned at the thought of having to replace a broken or worn plier tool, because it is difficult to repair it under ordinary circumstances. Also, because of steel shortages, and the demands of military establishments, exceptionally fine tools are becoming scarce. One tool manufacturer, recognizing the need for expert advice on properly repairing plier tools, has recently issued an illustrated booklet entitled "First Aid for Pliers" which should be in the hands of every telephone plant man.

The following procedures for repairing plier tools are extracted from this helpful booklet.

Bad rusting or rust-tightened joints require soaking in kerosene for anywhere from a couple of hours to a couple of days. A putty knife and steel wool will take off the loosened rust. A few drops of penetrating oil will help to free the joint. Once freed, opening and closing the pliers will gradually work the rust loose from the concealed parts of the joint.

Broken noses or tips can generally be ground off even. A hand or electric bench grinder will do the job. Keep the tool's temperature down by pressing lightly against the wheel and dipping in water frequently.

If the nose is open, that is, if the tips do not touch properly, put a wedge or piece of steel about 1/16" thick midway of their length (*Figure* 4). Hold securely on a firm base and tap gently with a hammer about ½" from the tip. Repeat on the other nose.

Loose, tight or jumpy rivets require the use of a ball peen machinist's hammer and a solid operating block (*Figure* 5). This block can be of steel, 2" x 4" about 6" long, a piece of railroad rail, an anvil or a heavy vise on a sturdy bench. For the first three it is necessary to have a hole at least ½" in diameter in the top. This hole need be only ¼" deep. When using a vise, the jaws would be opened ½". Always oil your pliers before starting repairs on the rivet.

A rivet has a solid and a broached side. The solid side can be seen as a circle. The broached side is an imperfect circle with four or more points—something like a star. Hold pliers horizontally with one handle in each hand as indicated in *Figure* 6. Holding one hand steady, move the other hand up and down ver-

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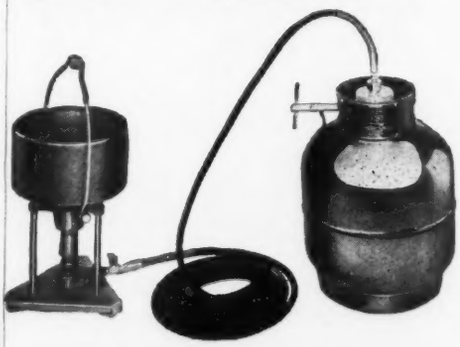

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tically. If there is any up and down movement, the rivet is too loose. Close the pliers and, again holding one hand steady, move the other hand sideways rather slowly. If the pliers open stiffly the rivet is too tight. If they do not open smoothly and seem to catch, the rivet has a jump.

Loose rivets are treated by placing the closed pliers flat on a flat section of the operating block, broach side down. Do not place over the hole in the block mentioned above. Hit the top half of the rivet with the flat head of the hammer. Try the pliers. If still too loose, repeat the operation.

Tight rivets are cured in a similar manner. Open the pliers to the first tight spot and place broach side down over the hole of your operating block. Hit the rivet with the flat head of the hammer. Try the pliers. Repeat if necessary.

Jumpy rivets are usually caused by a loose star point on the broach side of the rivet. Open the pliers to the jump, or catch, and jiggle slightly. Oil will ooze around the loose star or stars. Then place the pliers on the block and tap lightly on the loose star point with the round head of the hammer. A good rivet is one that allows the joint to open smoothly and easily with one hand. It may be necessary to perform all of the above operations before it works properly.

Dull cross-checking will not properly hold wire or fine objects. Cure this condition by stroking a "checking" file across the noses, matching the existing check (*Figure* 7). An emergency operation can be performed by using a triangular file such as is used for sharpening saws. Use just enough pressure to sharpen this check.

Dull cutting edges present the most difficult problem for first aid. Before doing any work on the edges, make sure the joint is acting properly. Then hold the pliers to the light with the cutting edge away from you. If you can see irregular, open nicks through the edge, it is faulty. Good edges are even and straight along their entire length, regardless of whether they can cut or not.

After this examination, open the pliers and place in a vise. Run a medium fine India stone across the entire edge, as illustrated in *Figure* 8, keeping the stone horizontal. A triangular stone works most easily and you will not have to remove the rivet to separate the halves of the pliers. Do the same for the other edge. This evens them up and removes minor nicks and burrs. Check against the light as before. Notice where the edges touch. If they meet along the entire edge, you are ready

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for sharpening. If they do not, stone across the edges (both of them) where they meet. Stoning must be even on both sides.

To sharpen—and this requires the surgeon's touch—place in a vise with the pliers open and the head flat. Take a few strokes with the stone on the outside bevel of the edge. (*Figure* 9). The established angle of the cutting edge is critical. It is necessary to keep the angle while stoning. The stone, of course, is kept oiled. Repeat the process on the other cutting edge. Check against the light

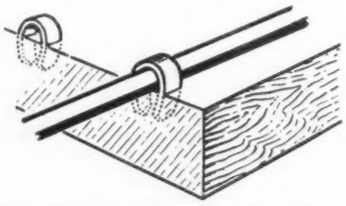

Fig. 11—Showing clinching feature of Heller staples.

for evenness. Now try a test cut on a piece of bond paper. If the edges cut only part way or don't cut at all, take a few more strokes.

Generally, only the outside bevel will require sharpening, but if necessary the inside bevel may be stoned also, but with caution. It is not necessary for the pliers to cut bond paper if they will cut the wire you normally use. Cutting bond paper is the supreme test for edge accuracy.

When the pliers are satisfactorily reconditioned, they can be kept in first class condition by applying an occasional drop of oil in the joint. A rubdown with an oily rag will form a rust preventive film.

Reasonable caution when storing your pliers will preserve their life indefinitely. If you must store them in a damp place, roll them in an oily rag and keep them in a metal box or can. Better still, give them a light coat of wax.

Free copies of the booklet on "First Aid for Pliers" can be obtained by writing the Utica Drop Forge and Tool Corporation, Utica 4, New York.

Developments in Interior Wire

LIKE OTHER TYPES of telephone wires, the wire used in interior telephone installations has undergone radical changes in type of insulation, covering, and conductor material. The braid covering and rubber insulation very commonly used for triple and pair inside wires have given way to individual plastic insulated conductors in twisted style wires. Another and more recent inside wire development is the use of brightly colored plastic insulated conductors covered with a brown or ivory plastic sheath. The coloring of individual conductors facilitates the identification of the conductors in making or tracing connections. The tough plastic jacket conceals the colored conductors, protects them from damage, and assures a neat installation when the wiring must be laid in exposed locations in finished rooms. The sheathed wire is very easy to install as it can be pulled through holes in floor or wall without kinking or jamming.

Copper has long been employed for the conductor material in interior wires. Copperweld wire, which is composed of a steel core with a copper jacket intimately welded to the core, is now being substituted for the copper conductors, primarily to conserve this critical material. This substitution, however, has resulted in certain advantages that may well make the use of copperweld a permanent feature of telephone interior wires. Tests have shown that the special soft steel core used in annealed copperweld wires made for this purpose results in pliability approaching that of copper and at the same time produces a conductor that is resistant to bending stresses. This feature is highly important in interior wire installations as the conductors must be able to stand up under stresses involved in splicing and connecting the wires.

Installers have had the annoying experience of splicing the small diameter wire and then, because of inadvertent bending at the splice, the conductor breaks off at this point, making resplicing necessary. The same trouble is apt to result when connecting copper conductors at terminals, and great care must be taken not to bend the wire sharply at the terminal screw. The use of the special soft steel core copperweld conductors in interior wires should eliminate this trouble.

For many years, the interior wire has been "tacked" to base-boards and door or window trim with insulated staples or disk-head wiring nails. This is often a difficult and tedious job, particularly when hard wood trim is involved, or the wire is being attached to hard fir joists. In laying basement runs, the hammering brings down dust, much to the discomfort of the installer, and it is often difficult to find room to swing the hammer because of interfering furnace pipes and other obstructions. The continual rapping with the hammer in the effort to drive the staples or nails in the restricted spaces produces considerable noise which is annoying to the occu-

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(Left): Hemingray "No. 9." Made from only 9 oz. of glass, but with a maximum leakage path approaching standard long-distance design. Inner skirt surface well protected from rain-splash; long skirt protects pin itself.

(Right): Hemingray "No. 14." Its double-petticoat feature is useful wherever fog and humidity prevail. Production economy in design and lightness make its low cost attractive for rural telephone line budgets.

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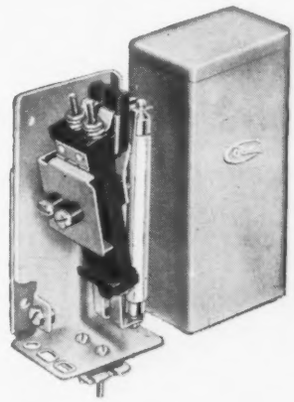

1. Uses a Cook Standard Type H Protector unit with molded bakelite base for high resistance to electrical and physical shocks.
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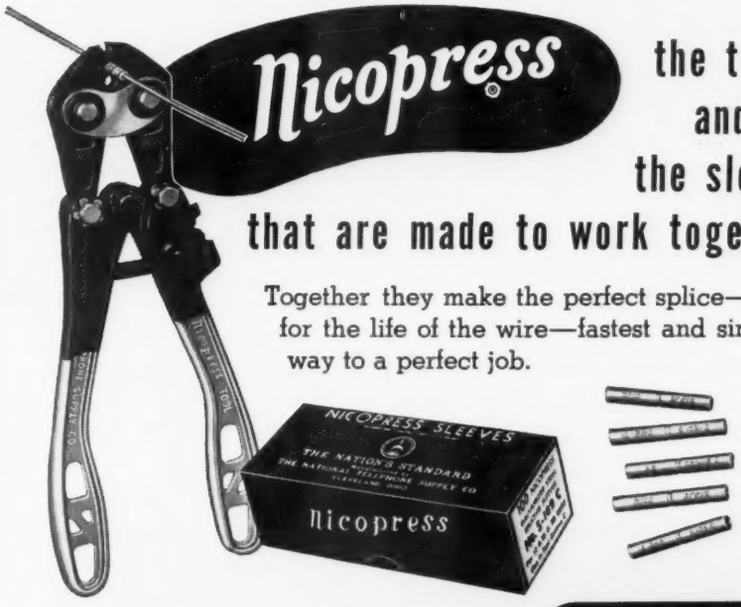

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pants of the house. These difficulties have led to the practice of using drive rings placed with wide spacings on runs in basement and unfinished rooms, even when only one inside wire is installed. Installing time generally averages 30 minutes for runs fastened with insulated staples and 20 minutes for runs attached with inside wiring nails.

A few years ago, stapling tools were introduced to save time and effort in fastening the wire runs. An improved type of stapling tool that is proving to be a real labor saver is the Heller stapling gun illustrated in *Figure* 10. Experiments in laying several different types of telephone interior wire with this tool indicates that wire runs of average length can be laid in five to ten minutes.

The type of stapler illustrated is operated with one hand, leaving the other hand free to stretch and hold the wire. The tool holds a clip of 40 staples which is more than enough for the average length run. These staples are automatically fed and driven by pressing on the lever which trips a hammer in the stapler head and drives the staple into the surface (*Figure* 11). These staples are standard "spear pointed" brown or ivory finished staples which can be driven into the hardest of woods, including pine knots, with ease. They are spaced about 24 inches apart in basement runs and, where appearance is a factor as in finished rooms, they are placed closer together, 12 to 18 inches apart.

The tool can be used in corners and difficult wire locations as indicated in *Figures* 12 *to* 14. It can drive staples in restricted spaces as between furnace pipes and joists. Since it requires only one blow to drive each staple, there is considerably less noise than when driving insulated staples or wiring nails with a tack hammer.

Fig. 15—Stapling various kinds of telephone wires with the Heller stapling gun. From top down: #22 Plastic sheathed inside wire; #14 insulated ground wire; #22 twisted triple plastic or braid covered inside wire; #20 twisted pair bridle wire; #22 paired plastic inside wire (with double staple); #18 twisted pair bridle wire (one conductor at a time stapled); #18 twisted triple braid inside or bridle wire (two conductors at a time stapled.)

The stapling gun is designed for use on the sheathed type of interior wire, but it will also firmly attach triple plastic or smaller diameter braid and rubber covered inside wire as indicated in *Figure* 15. When reinstalling old style olive-green interior wire which has large diameter conductors, two conductors of triple wire can be stapled. To fasten paired twisted plastic insulated wire, two staples can be driven together, one on top of the other to drive the first staple in deeper and hold the wire better. As long as the conductors fit inside the staple, the stapling gun will not damage the wire as proved by repeated tests.

(To be continued)

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We're proud to do our part in the defense program. The Neale Construction Company has been chosen by the Government for a number of outside plant construction jobs. And we have bent every effort to complete all our defense assignments in record time.

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These fine Signal Corps photographs show the men and equipment of the Neale Construction Company on the job at Camp Hood, Texas. Top picture shows the Neale Cable Spinner in operation. Center shows the full complement of Neale personnel assigned to the job. Bottom shows a crack Neale crew and their modern construction equipment.

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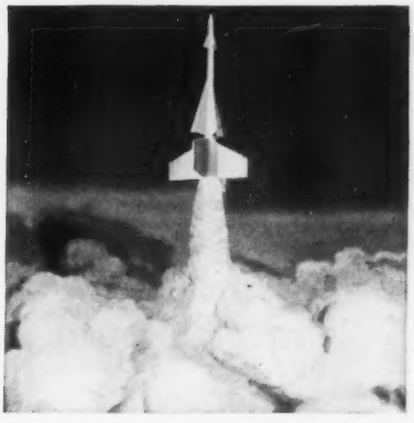

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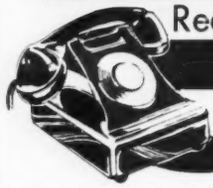

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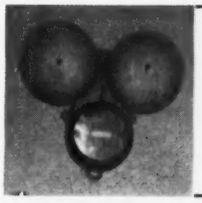

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BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.—[ADV. 8]

BELTS — CLIMBERS — PLIERS — SAFETY STRAPS—CONSTRUCTION TOOLS. Klein & Sons, Mathias. 3200 Belmont Ave., Chicago 18, Ill.—[ADV. 9]

BOOTHS—Acoustic Telephone—Sherron Metallic Corp., 1202 Flushing Ave., Brooklyn 6, N. Y.—[ADV. 10]

BOOTHS—Churchill Cabinet Co., 2119 Churchill St., Chicago 47, Ill.—[ADV. 11]

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CABLE SPINNING—The Cable Spinning Equipment Company, 432 Crane St., Topeka, Kans.—[ADV. 13]

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CONNECTORS, CABLE—Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.—[ADV. 15]

CORDS, Instrument and Operators—Commercial Cord & Supply Co., 26 Main St., Clifton Springs, N. Y.—[ADV. 16]

CORDS, Switchboard & Telephone—Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.—[ADV. 17]

CROSS ARMS—American Cross-Arm, Inc., 141 W. Jackson Boulevard, Chicago, Ill.—[ADV. 18]

"EARTH BORING MACHINES" Sterling Model "A"—Precision Engineered and Hydraulic Controlled. Sterling Engineering & Mfg. Co., 173 Gilligan St., Wilkes-Barre, Pa. —[ADV. 20]

ELECTRIC HOT WATER HEATERS. Thermostatically controlled for any hot water heater, Vulcan Electric Co., Danvers 17, Mass.—[ADV. 21]

The New Products' Showcase

This month the "New Products' Showcase" introduces —(1) a new Transposition Bracket, (2) the Utica Midget Plier Snip, (3) the "Wen" Soldering Gun, (4) a new Lightning Arrester, (5) a new Plastic Mallet, and (6) the Chance Pole Key Anchor.

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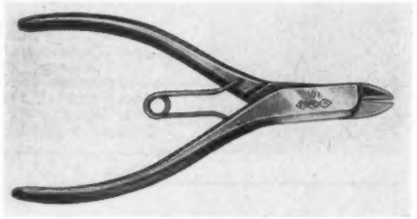
Hubbard & Co. has added two transportation brackets to its line, designed for the heavy loads imposed by long spans, corners, and winter icing. Numbers 9253 and 9264 have been designed to fulfill the specifications of R.E.A. They clamp solidly on standard 3¼ x 4¼ inch arms, with ample "give-and take" to allow for variations in the dimensions of such arms, and eliminate canting or turning. The brackets are formed of ⅝ x 1½ inch galvanized steel and have 11/16" pin holes and ⅜" screw holes for attachment with wood or lag screws.—For free literature, Check New Product 407.

SOLDERING GUN

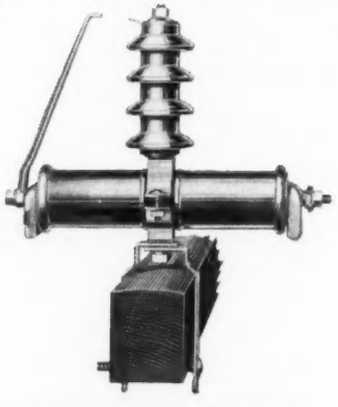
The low cost WEN Soldering Gun is a versatile "quick-hot" transformer type soldering device which heats instantly (in 3 to 5 seconds) when trigger is pressed.—Check New Product 409.



MIDGET PLIER-SNIP

Utica Drop Forge & Tool Corp. is now marketing a new 4½-inch Plier-Snip #101 which is finding a quite wide range of applications wherever fine wire cutting or thin metal snipping is encountered.

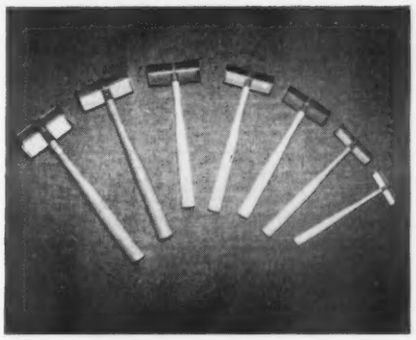
Originally designed for use in electronic and incandescent lamp manufacture, the rugged little pliers features an extended throat for greater reach in cramped quarters. — Check New Product 408.



LIGHTNING ARRESTER

Hubbard & Co. has announced the addition of a new member in its line of "Autogap" Lightning Arresters. "Number 2327" is of horizontal design and embodies the well-known features of the other "Autogaps," including the twin exhaust to provide maximum surge capacity. The new "Autogap" has a maximum voltage rating of 18,000 volts, twice that of any previous member of the "Autogap" family. It may be installed on arm or pole with standard Hubbard mounting brackets.

For Bulletin 951 Check New Product 410.



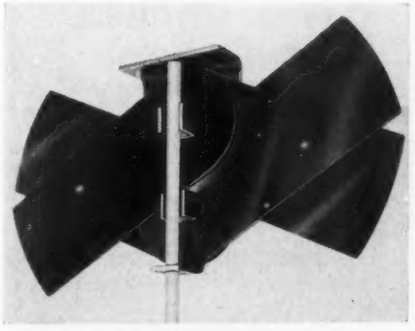
PLASTIC MALLETS

Matticks Manufacturing Co. manufacturers of plastic hammers and mallets, recently announced the development of a new line of soft plastic mallets.

There are seven models in the new line with head weights varying from 1 oz. to 14 oz., head diameters between 3/4" and 2", and head lengths between 2 3/4" and 4".

The heads, made of tough, yet resilient cellulose plastic, can be refaced with a file or grinding wheel when they become distorted or damaged. This special material also permits the faces to be shaped to meet special requirements. An added feature of the Matticks Mallet is the steel locking pin, which holds the head securely to the fine, second-growth hickory handles. This feature also enables the mallet to meet the safety requirements of the Tool Safety Engineers.

For further information Check New Product 411.



POLE KEY ANCHOR

The A. B. Chance Co. has announced this new design for the Pole Key Anchor used for keying poles at the base to prevent leaning as the result of one sided strain where guys are impractical. The device is also used just below the ground level on the strain side to take the place of wooden planks or logs that are sometimes used for the top key.

This Chance Pole Key is dropped into the hole beside a newly installed pole with the anchor rod attached. When it is in position at the bottom of the pole, it is expanded by tamping on its top plate in the same way that an expanding anchor is opened. This forces the blades out into the solid earth making a highly efficient pole key that is much cheaper and easier to install at the base of the pole than log or plank keys. The anchor rod is then removed.

The pole key is often used on street lighting or telephone circuits dead ended in residential districts where guys would be undesirable or impossible to install.—For further information Check New Product 412.

Buyers' Directory

ENGINEERING, Construction—Neale Construction Company, 432 Crane St., Topeka, Kans.—**[ADV. 22]**

FURNACES—For quickly and economically melting lead and paraffin—Mutual Liquid Gas Equipment Co., Inc., 3600 W. Imperial Highway, Los Angeles, Calif.—**[ADV. 23]**

INSPECTION SERVICE—For poles, crossarms, and preservative treatments. Inspectors stationed throughout U.S.A. A. W. Williams Inspection Co., Mobile, Ala.—**[ADV. 24]**

INSULATORS, Porcelain—Porcelain Products Inc., Box 300, Findlay, Ohio.—**[ADV. 25]**

LIGHTWEIGHT PULLERS—Coffing Hoist Company, 800 Walters St., Danville 5, Ill.—**[ADV. 26]**

PIPE PUSHERS—Giant Manufacturing Co., South 6th St., at 12th Ave., Council Bluffs, Iowa.—**[ADV. 27]**

PIPE PUSHERS—Greenlee Tool Co., 2136 12 St., Rockford, Ill.—**[ADV. 28]**

POLE HOLE DIGGERS—For derrick mounted trucks. Tele-E-Lect Products, Inc., 9613 Minnetonka Blvd., Minneapolis 16, Minn.—**[ADV. 29]**

POLES—Cedar poles and Fir cross arms. R. G. Haley & Co., Inc., Spitzer Bldg., Toledo 4, Ohio.—**[ADV. 30]**

POLES, Southern Yellow Pine—Colfax Lumber & Creosoting Co., Inc., P.O. Box 23, Pineville, La.—**[ADV. 31]**

POLES, Creosoted Southern Yellow Pine and Douglas Fir. The Long-Bell Lumber Company, Wood Preserving Div., R. A. Long Bldg., Kansas City, Mo.—**[ADV. 32]**

POLES, Southern Yellow Pine—Taylor Colquitt Company, 290 E. Main St., Spartanburgh, S. C.—**[ADV. 33]**

POLES, Southern Yellow Pine—Texas Creosoting Co., Orange, Texas.—**[ADV. 34]**

POLES—Texas Best pressure-creosoted poles, Lone Star Creosoting Co., P. O. Box 9, Longview, Texas.—**[ADV. 35]**

POLES—Western Red Cedar, Western Larch, Lodgepole Pine. B. J. Carney & Co., Minneapolis 3, Minn. and Spokane 8, Wash.—**[ADV. 36]**

POLES & CROSSARMS—Creosoted poles and crossarms. Conroe Creosoting Co., Conroe, Texas.—**[ADV. 37]**

PROTECTIVE EQUIPMENT—Reliable Electric Company, 3145 Carroll Avenue, Chicago 12, Ill.—**[ADV. 38]**

PRINTING—Telephone forms, Cullom & Ghertner Co., 600 21st Ave., Nashville 4, Tenn.—**[ADV. 39]**

REBUILT TELEPHONE & SWITCHBOARDS—Telephone Repair & Supply Company, 1760 Lunt Avenue, Chicago 2, Ill.—**[ADV. 40]**

SUPPLIES—New all metal heavy duty extension loud ringers; ready wire reels, payout only and payout and takeup in one.—Suttle Equipment Co., Lawrenceville, Ill.—**[ADV. 41]**

SWITCHBOARDS, TELEPHONES, ETC.—Automatic Electric Co., 1033 W. Van Buren St., Chicago, Ill.—**[ADV. 42]**

TELERING—Telephone ringing by frequency conversion. Voltage range for all purposes, central office and private branch exchanges. Telkor, Box 186, Elyria, Ohio.—**[ADV. 43]**

TRUCK BODIES—Highway Trailer Co., Edgerton, Wisc.—**[ADV. 44]**

TRUCK BODIES AND EQUIPMENT—McCabe Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo.—**[ADV. 45]**

WIRE DROP & INSIDE—Jackets of neoprene, rubber or plastic. Lowell Insulated Wire Co., Lowell, Mass.—**[ADV. 46]**

WIRE, Insulated—DATED DROP WIRE—Neoprene or Weatherproof—Alphaduct Wire & Cable Co., Milltown, N. J.—**[ADV. 47]**

WIRE, Insulated Drop and Bronze or Copperweld—Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtucket, R. I.—**[ADV. 48]**

WIRE, Insulated Drop, Genuine Ironite—Paragon Electric Co., Two Rivers, Wis.—**[ADV. 49]**

WIRE, Insulated Drop, HT Bronze, Paraprene or Braid Insulation—Paragon Electric Co., Two Rivers, Wisc.—**[ADV. 50]**

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ADV. 19.....	ADV. 20.....	ADV. 21.....	ADV. 22.....	ADV. 23.....	ADV. 24.....
ADV. 25.....	ADV. 26.....	ADV. 27.....	ADV. 28.....	ADV. 29.....	ADV. 30.....
ADV. 31.....	ADV. 32.....	ADV. 33.....	ADV. 34.....	ADV. 35.....	ADV. 36.....
ADV. 37.....	ADV. 38.....	ADV. 39.....	ADV. 40.....	ADV. 41.....	ADV. 42.....
ADV. 43.....	ADV. 44.....	ADV. 45.....	ADV. 46.....	ADV. 47.....	ADV. 48.....
		ADV. 49.....	ADV. 50.....		

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YORK-HOOVER CORP. 60th Birthday

1952 MARKS THE 60th Anniversary of the York-Hoover Corp., York, Penna., a pioneer in the design, development and construction of specialized commercial truck bodies, and one of the leading manufacturers of this equipment in the Nation today.

The principal element of the present York-Hoover Corp. had its corporate beginning back in 1892, although its inception preceded this date by seventeen years.

The firm then manufactured and sold horse-drawn wagons of many designs and capacities for practically all of the then existing vocational purposes.

In 1908 when the fast-growing motor truck industry began replacing the horse-drawn wagon, York-Hoover pioneered in this conversion by placing commercial bodies first on the available passenger car chassis and then on various truck chassis as they appeared on the market.

It also started to build the "Hoover" truck and sold these in some quantities until 1912 when the rapid expansion of the commercial body business necessitates the use of its entire manufacturing facilities for this purpose.

In its history York-Hoover has many "firsts" to its credit. It played an important part in converting the public utility industry from horse-drawn vehicles to motor transportation; it built one of the first franchise-operated passenger bus bodies to operate in the East; it assisted in redesigning the horse-drawn U. S. Mail vehicle for use on a motor truck. The first "Jeep" body was manufactured by York-Hoover at the start of World War I and in World War II it was the first plant in the Philadelphia Ordnance District, which embraces seven States, to be awarded the Army-Navy "E" Flag with 4 Stars.

At the present time the Body Division of the York-Hoover Corp. is again helping to rearm America in addition to supplying civilian needs.

Current products include a complete line of body units for the public utility field as well as body designs for Railway and Motor Freight haulers, Bakeries, Dairies as well as the Frozen Food and Soft Drink industries. York-Hoover's customers are located in all parts of the U.S.A.

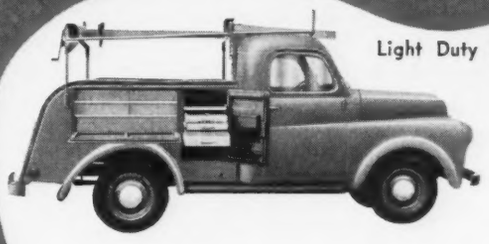
Throughout its 60-year history, York-Hoover has experienced a steady growth and today the Body Division operation covers an area of about 5 acres. This area is being increased and additional manufacturing equipment of the latest design will be installed.

YORK-HOOVER

IS PROUD TO ANNOUNCE

THAT 1952 IS ITS

60th Anniversary Year



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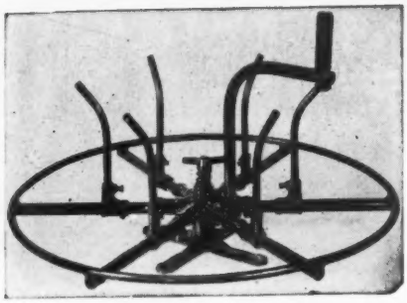
We are grateful for the privilege of serving you during the past 60 years and will continue to serve you faithfully during the years to come.

1952...OUR 60TH ANNIVERSARY YEAR

YORK-HOOVER CORPORATION

YORK, PENNSYLVANIA



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The Suttle reel with the take-up handle provides six adjustable forks to make a round coil when taking down used wire. Ideal for salvaging that used wire you may need next winter.

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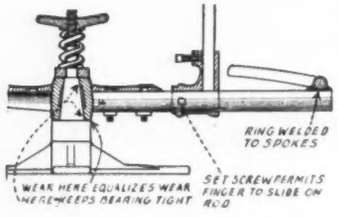
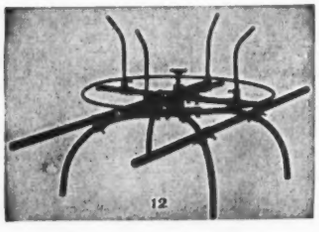
Suttle Wire Reels

7 — Styles or Models — 7



It Never Wobbles

The cone-bearing feature on Suttle reels prevents spindle wobble even after years of wear because the socket slides up on the cone as it wears.



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Suttle EQUIPMENT CO.

LAWRENCEVILLE ILLINOIS

Frank H. Woods and Hiland H. Wheeler

(Continued from page 65)

istered blue rock shooting contest on Sunday, March 30, when he was stricken. His death was also due to a heart ailment.

Frank H. Woods was born in Boone County, Illinois, February 1, 1868. He went to Nebraska with his parents in 1883, attended preparatory school and the State University from which he graduated as Bachelor of Literature in 1890. Extended studies in the law colleges at Columbia and Nebraska Universities prefaced his admission to the bar in 1892. As a practicing attorney at Lincoln, he was one of the incorporators of the Lincoln Telephone Company and, through circumstances, he was soon obliged to take over the direction of its precarious existence. He served as its president until 1946 when he was succeeded by his son, Thomas C. Woods, and Frank Woods was elected chairman of the Board.

In December, 1909 Mr. Woods was elected president of the National Independent Telephone Association and was appointed chairman of the famous "Committee of Seven." In this capacity he was instrumental in shaping the destinies of the warring Independent and Bell interests into a compromise plan for division of territory, elimination of costly urban competition, and connection of Independent exchanges with the national long lines network, then coming into being and controlled almost completely by the Bell.

Through his personal endeavors the Lincoln company purchased the Bell holdings, including toll lines, in 22 counties of Southwest Nebraska, later consolidating the competing exchanges. This area comprises the present operating territory of The Lincoln Telephone and Telegraph Company.

Mr. Woods represented several other large Independent operating companies in conciliating their interests with those of the Bell. He was the central figure in the arbitration which arrived at an exchange of manufacturer's license and patent rights and gave impetus to the nationwide trend toward the dial system.

As other involved conditions in the telephone industry were resolved through the mediation of Frank Woods he became known as a great conciliator. His associations broadened and his interests were enlisted in other spheres of activity. As a business doctor he nurtured ex-

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tensive, though nearly defunct, coal mining operations in Southern Illinois into the Sahara Coal Company, one of the nation's most successful organizations in its field today. In suburban Cleveland one of the world's most modern and efficient plants for manufacturing business machinery, the Addressograph-Multigraph Company, stands as a monument to Mr. Wood's organization and direction in this specialized field.

The wide personal publicity which came as a consequence to his brilliant career was to him distasteful, yet many rewards flowed to him as a result of his enterprise. Singular honors of the past few years have included the Distinguished Service Medal and the Honorary Degree of Doctor of Laws from the University of Nebraska; the Ak-Sar-Ben Good Neighbor Award and the Kiwanis Medal for Distinguished Service.

Mr. Woods was in apparent robust health until his last moment. He worked vigorously in the primary campaigns and had shown no indication of the impending attack. It is probable that the shock of Hiland H. Wheeler's sudden death may have contributed to his own.

Mr. Wheeler, vice president of The Lincoln Telephone and Telegraph Company, accompanied by a Lincoln doctor, had driven to a neighboring city to shoot in the local Isaac Walton League Gun Club's competition. He registered a perfect score in the 50 target, 16 yard event and had broken 34 straight in the handicap shoot which followed, when he suffered the fatal attack. His companion attended him when he collapsed, but Mr. Wheeler died immediately. He had been troubled for several years with a heart ailment. He was 62 years of age.

Mr. Wheeler had been engaged in public utility work since his graduation from the University of Nebraska in 1909. He was employed by the Burlington Railroad in construction and maintenance engineering for four years; and for two years was assistant superintendent of the central station of the Milwaukee Railway and Light Company. In 1915 he was employed as engineer by the Lincoln Telephone and Telegraph Company. He was made plant engineer in 1917 and became chief engineer in 1923. His election as a member of the Board and vice president came in 1949.

At the time of his death, Mr. Wheeler was serving as first vice president of the Lincoln Chamber of Commerce and was a member of the Board of Directors of the United States Independent Telephone Association.

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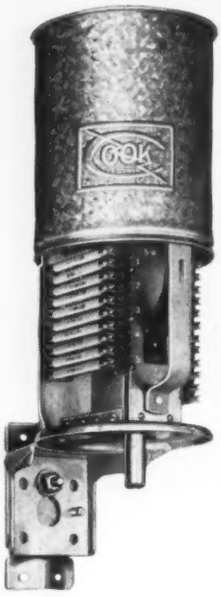

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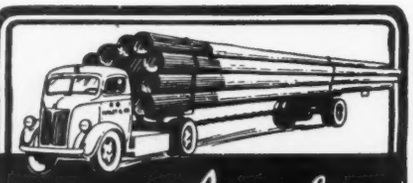

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COFFING HOIST: New Hoist-Binder

SAFETY, CONVENIENCE and simplicity of operation are stressed in the new Hoist-Binder announced by Coffing Hoist Co., Danville, Ill. Since this load binder works on the ratchet hoist principle, it will take up or slack off a load chain any amount up to a full 20½ inches—or more if a longer chain is used in the binder.

According to the manufacturer, this advantage over eccentric type binders is especially important with

Ratchet operating principle of the new Coffing Hoist-Binder permits tightening or slacking off any amount without releasing load for a new "grab."

"springy" loads where the binding chain or cable must be tightened by force through considerable distance in order to fully secure the load. Also, if a load settles in transit, the new Coffing unit is easily tightened any amount without the necessity of releasing the entire load to take a new "grab." Full strokes can be used for rapid take-up; half strokes permit minute adjustments. To further speed operation, the binder chain may be pulled freely through the ratchet when not under load.

Another advantage claimed for the ratchet and pawl construction of the Hoist-Binder is operating simplicity. Binding and slacking off is by means of the handle only.

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Published by the makers of famous XY Equipment

VOL. 1, NO. 1, APRIL 1952

STROMBERG-CARLSON COMPANY

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TO THE INDEPENDENT TELEPHONE INDUSTRY:

The following six pages comprise the first in a series of special sections which Stromberg-Carlson will publish monthly in this magazine. The purpose is to bring to our friends of the industry a regular review of developments within the operating world and within our company.

Things move so fast in the tempo of modern American telephony that there are many "news" items which cannot be adequately reported through the usual channels. Such items make "shop talk" when a few parties meet, but often they are not generally disseminated, although they are of general interest.

We propose, therefore, to put into these pages capsule reports of achievements by independent telephone companies and by our own firm, hoping that their publication will benefit the industry as a whole.

Your comments, criticisms and contributions will be most welcome.

Yours for independent progress

A. F. Gibson
Divisional General Manager

ATLANTA CHICAGO KANSAS CITY SAN FRANCISCO

STROMBERG-CARLSON transmitter

Development of the 1400 Series Telephone

By J. H. VOSS,
Chief Engineer, Telephone Division,
Stromberg-Carlson Company

THROUGH trade-paper announcements and mailings from our company, most of the independent operating world has heard of the new and improved telephone set which Stromberg-Carlson has produced as a replacement for the present well-known 1200 series. The purpose of this article is to put forward a few of the "inside stories" of the development and the engineering features of the new series.

Our justification for the expense and effort involved is found in telephony's very exacting requirements, both in the appearance and the performance of any instrument. These requirements necessitated the development of a completely new form of telephone set—affecting both outward appearance and interior design.

Refreshing New Design

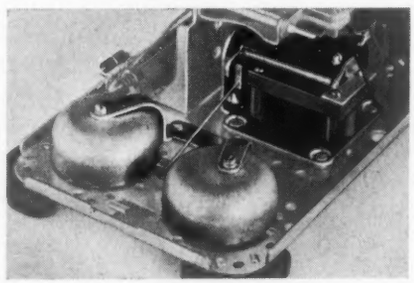
The new telephone set is a composite of refreshing exterior design and advanced functional engineering, with low sweeping lines, modern, yet not radical to the extent that the 1200 series telephone is outmoded. In fact, many pleasing lines of the 1200 series telephone are found in the new 1400 series set. A distinctively new feature is the large extended dial number plate locating the letters and digits outside the fingerwheel for greater visibility. Another innovation is the cradling of the handset on rugged phenolic plungers to provide a pleasing appearance and definitely prevent the cord from interfering with proper operation of the hookswitch; a most satisfactory means is also provided for changing the set for wall mounting by the substitution of a set of plungers designed to properly cradle the handset when mounted as a wall instrument. Large feet of non-marking rubber prevent the instrument from moving during dialing and provide a pleasing symmetry of appearance by projecting slightly beyond the housing. The handset and line cords enter through slots in the rear corners of the housing.

Long-life Housing

The housing of the 1400 series telephone is functionally a cover and is molded of black cellulose acetate butyrate (Tenite II), a tough thermoplastic material well suited to absorb hard blows without breakage. The interior has a ribbed construction for maximum strength and these ribs rest over a formed-up edge of the base to hold the housing firmly in place. A bar near the back of the housing connects and reinforces the plunger guides; also provides a means for lifting the well-balanced telephone. A molded-in clip attaches the front of the housing to a lug in the base; the back of the housing is then drawn down and locked in place by a taper-headed screw.

The interior of the 1400 series telephone reveals a compact operating unit with all components immediately accessible and directly mounted to the sturdy steel, zinc plated base. Holes are provided under the ringer gongs to increase the sound output. The main bracket for the hookswitch is of steel "channel" construction for ultimate strength and rigidity; this bracket also supports one end of the dial mounting or dial blank bracket.

The hookswitch and plungers which cradle the handset are mounted directly to the base and therefore may be operated with the housing removed. Contact springs with twin contacts of precious metal are operated directly by the hookswitch lever without complicated linkages and the spring combination is covered by a transparent cellulose acetate dust cover which slips out easily for inspection. A separate coil spring operates the hookswitch when the handset is removed and the contacts are arranged to close at the correct travel point to prevent "false pulses" being sent out by accidental "jiggling" of the plungers.



New Loud-Soft Ringer

The ringer is of a new design, having a single coil instead of the more familiar two coil construction and is mounted directly on the base. The coil has a laminated silicon-steel structure and is wound on a molded spool form for better insulation and freedom from electrolysis. The carefully annealed soft iron armature and frame

form the return magnetic path, producing a more stable and efficient magnetic structure and a small Alnico V magnet provides higher permanent flux and longer life. This design results in a ringer of much greater sensitivity with increased impedance at ringing and voice frequencies. The higher impedance reduces the problem of noise induction on lines where the ringers are connected between each line wire and ground and permits more ringers per line than formerly possible because a lower value of capacitance can be used in series with the ringers.

The harmonic ringer has an improved reed type suspension which avoids any tendency for the ringer to "hang" when located a short distance from the central office and a fixed air gap eliminates field adjustment. The straight line ringer is of the same general construction but has the armature suspended by means of a stainless steel bearing pin; a bias spring is employed which can be adjusted by bending a tab.

The sound output of the ringer has been increased by using larger size gongs having a new contour. The two gongs differ in their functional frequencies to produce a pleasing sound and are adjusted by rotation on "off-center" mounting holes. To reduce "clatter" and obtain the ultimate in sound output, the gongs are mounted on a resilient bracket attached to the base. Ringer volume can be controlled by the subscriber operating a three-positional switch projecting through the base of the set without change of tone.

Extended number plate

The dial is the current model with a new number plate of molded Tenite II having the numbers and letters impressed in the underside. The complete dial mounts on a bracket which snaps into position on the base and a gasket around the outer edge of the number plate insures a dust tight seal when the housing is in place. The dust cover and twin contacts on the dial (introduced some years ago) provide the ultimate in reliability and long life.

An adapter of black Tenite II to match the appearance of the housing permits the use of conventional size dials of most makes without the extended number plate feature.

For Manual Service

Telephone companies using manual service can have all the advantages of the new telephone with provision for economical conversion to dial by the use of a dial blank of Tenite II. The dial blank consists of the adapter for conventional size dials and a blank which uses the station card and holder from the Stromberg-Carlson dial.

The 1400 series telephone employs the capsule type transmitter and receiver units and the "potted" coil-capacitor unit of the 1200 series telephone. The transmitter is a modern non-positional unit having gold-plated electrodes and the receiver is a high efficient unit having an Alnico permanent magnet construction and a damped response characteristic. The coil capacitor unit is "potted" with hydrolene to render it impervious to moisture. The telephone circuit is a high efficiency anti-sidetone circuit insuring maximum transmitting and receiving efficiency.

The handset and line cords have polyvinyl insulated tinsel conductors with an exterior braid of black nylon to provide greatly increased life, less tendency to kink, improved flexibility, as well as better appearance.

The 1400 series telephone will, in the near future, provide an extended range of transmission for use over longer distances from the central office or with finer gauge cable conductors without change in the central office facilities. It presently provides increased dialing and ringing ranges to meet these requirements.

MEET
ARTHUR F. GIBSON

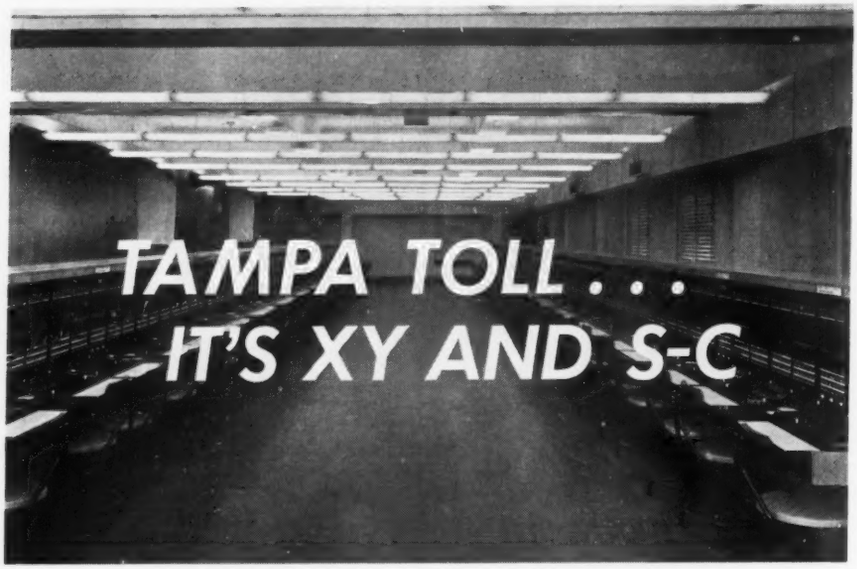
WHAT are Telephone General Managers made of? One formula might combine equal parts of Engineering, Accounting, Production, Salesmanship, Finance and Materials Control, seasoned with a tremendously wide acquaintance within the communications world. At least, that's the analysis of A. F. ("Art") Gibson, general manager of Stromberg-Carlson's telephone division.

Except for brief employment, just after college, with a contractor and a grocery store, Art Gibson's business life, since 1912, has been exclusively with Stromberg-Carlson. Starting as an inspector of incoming materials, he progressed through Production Control, Cost Division, Assistant Credit Manager, Credit Manager, Assistant Treasurer and Office Manager. World War II added a few headaches, and much experience, by dropping on his able shoulders the responsibilities of priorities and material controls. His success is best told in his present position—general manager in full charge of the engineering, manufacture, quality control and sale of all Stromberg-Carlson telephone and switchboard equipment.

Married? Yes. Children? Two—both in the armed services during World War II—lieutenant Norman being a naval radar expert, technical sergeant Dale a member of the army quartermaster corps. Grandchildren? Four—a little too young to have yet decided their careers, but bets are laid that Art's technical and managerial achievements will influence them, too!

A.F.'s a bowler, a golfer, a baseball fan, a fisherman, a gardener, a lecturer, an active churchman and—as hundreds of members of the U.S.I.T.A. and the Pioneers know—the sort of guy you're glad to find as your seat companion on a long trip. You'd have to twist his arm to get him to talk about his own affairs—he'd rather listen to yours, which is one reason he's a good man in his job.

STROMBERG-CARLSON transmitter



Equipment Room, Tampa Main Exchange

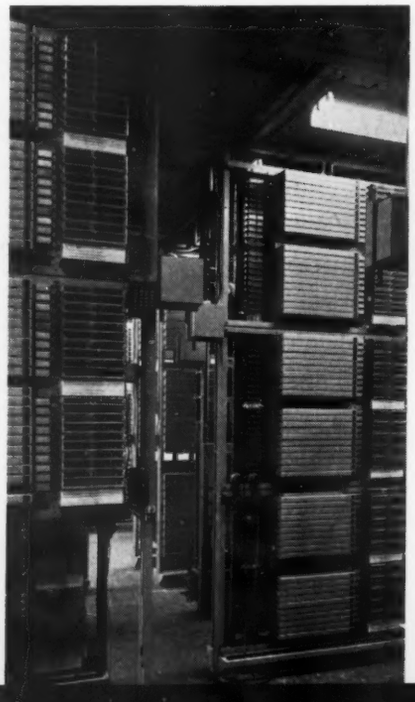
ON February 2nd of this year, the Peninsular Telephone Company at Tampa, Florida, cut into service a new toll board and inter-toll dial switching equipment of Stromberg-Carlson manufacture for operator toll dialing within their own network of 26 exchanges located in 12 cities and for operation with the Bell Company's Nation-wide Operator Toll Dialing Network.

The new 80 positions of No. 3 type toll board are equipped with key senders and the associated XY inter-toll dial switching equipment provides for extending calls to distant points, the completion of calls to local Tampa subscribers from distant points and for the handling of calls routed through Tampa.

This vast undertaking for toll facilities to fulfill the needs of Peninsular Telephone Company for today and in the future is the result of the combined efforts of the staffs of both companies, started shortly after the end of World War II. Many innovations have been incorporated in the inter-toll switching system. Most notably are the use of outgoing (O.G.T.) jacks to access the large number of dial and ringdown trunks to reduce the size of the jack multiple and a simplified method of pad control for voice repeaters.

St. Petersburg and Clearwater have also been cut into the Nation-wide Operator Toll Dialing system through the use of Stromberg-Carlson No. 3 type toll boards and XY inter-toll dial switching equipment. The Peninsular Telephone Company now employs operator toll dialing exclusively between most of its cities and has definite plans for changing all of their present toll dialing facilities for operation with the Nation-wide Operator Toll Dialing plan.

The Peninsular Telephone Company owns their toll line facilities within their own network of exchanges and employs "polar duplex" facilities as the means for dialing between cities. The Bell toll line circuits connect many of their cities directly to "Area" switching points throughout the country through the medium of "single frequency" dialing.



Foreground: Inter-toll Selectors, Tampa Office

PERSONAL

Ohioans Southward-bound: Doylestown's E. W. Stepfield, Hudson's Weldon Case and Lima's George Quatman, with their spouses, all headed for Florida. And New Orleans' Mardi Gras will entertain Mr. and Mrs. Earl Belch, of Columbus Grove.

•

New papas: Plant superintendent of Navosota, Texas, George Franks (a 6 lb. 10 oz. girl). And, to even things, it's a 7 lb. 11 oz. *boy* for the Walter Gearys. Walt's equipment engineer at Southwestern Associated, Dallas.

•

Honors: to Jas. F. Martin, v.p. and gen. mgr. of Navosota's company, newly elected president of the Grimes County Chamber of Commerce. To L. W. Schreckengast, just made manager of Lebanon's Ohio Central Tel. Co. And to W. R. McGrew, Middle States' Pekin, Ill., district commercial boss, now promoted to Division commercial superintendent, with headquarters at La Crosse, Wisc.

•

Congratulations: to the Farmers Mutual Telephone Company of Clarinda, Iowa, which, on January 27th, became the first Independent company in the state to introduce operator toll dialing. First use was a connection to Council Bluffs. The toll equipment is Stromberg-Carlson.

•

Candid Camera catches Stromberg-Carlson salesman Morrie Hansen watching T. J. Wells throw the switch which, on Dec. 14, 1951, cut into service the new XY system at Sisters, Oregon.

•

Family ownership was retained when Frank Eels, owner since 1927 of the Spencer-Van Etten (N.Y.) Tel. Co., retired and sold the business to his son Otto.

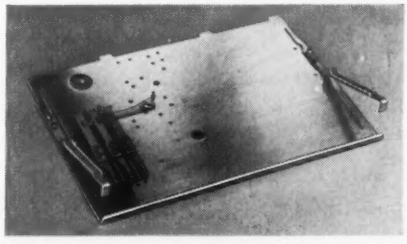
STROMBERG-CARLSON **transmitter**

FACTORY TRIP

EDITOR'S NOTE: When executives of operating companies visit us at Rochester, they inevitably ask for a tour of our manufacturing plant. We wish every independent operator in America could find time for such a trip. As next best, we propose to publish a monthly feature outlining some production techniques of general interest. Suggestions from readers of subjects to be covered herein will be welcome.

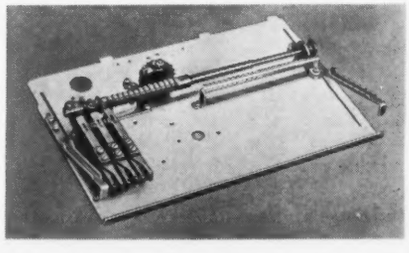
XY Switch Assembly is the key to its efficiency

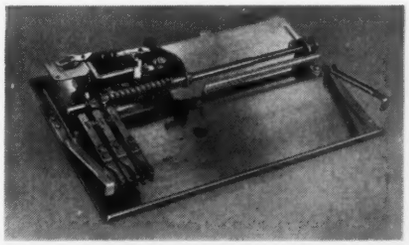
"WATCH something being made and you'll better understand its purpose." That fundamental of technical *teaching* has equal merit in technical *appreciation*. We believe that any telephone man who can follow the assembly steps of XY Switch manufacture (as briefly shown here) will understand better why this Stromberg-Carlson dial switching system is so accurate, reliable and trouble-proof.



HERE'S the Mechanism plate, of heavy gauge steel. All components are securely screwed into mounting holes whose locations are governed by close tolerances. Lock Springs on each side are made of special alloy steel, clamping the switch into place in the dust-proof cell, but requiring only light pressure to release when shifting switches from one cell to another. All springs in the Spring Pile-ups have twin precious metal contacts.

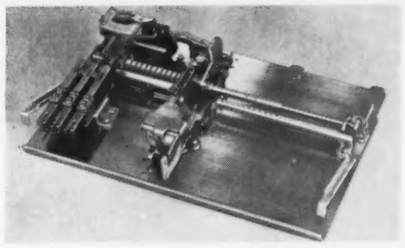
NEXT step is to add the Cog Roller assembly of case-hardened steel, sliding on a hardened steel tubular shaft. This provides the mechanism for stepping the switch in both "X" and "Y" directions. Also included is a Retaining Pawl to hold the correct "X" position, a coil spring to return the cog roller "home," and a Guide Rule to prevent "X" motion until "Y" motion is completed.

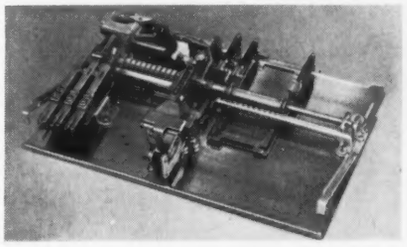




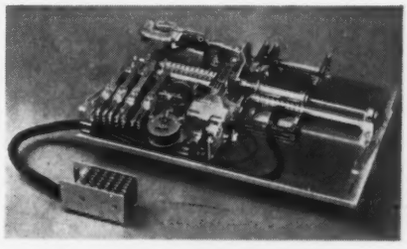
NOW is added the X-Magnet assembly and the associated X-Driving Pawl of case-hardened steel. The armature of the X magnet, causes the driving pawl to actuate the X-Gear Assembly, moving the wiper carriage out along the shaft. Retractile pressure is maintained mechanically. The X-gear is prevented from over-running by the tip of the armature, which engages a tooth of the X-Gear Assembly sprocket at the completion of each stroke.

THE Y-Magnet assembly has now been added. When pulsed, the armature is drawn down and the Y-Driving Pawl engages a ratchet tooth of the cog roller, stepping the switch into the wire bank. An ejector, protruding from cog roller support, governs the travel of the driving pawl. The Stop Bar, operated by a cam on the Y-armature, engages a ratchet gear on the cog roller as the Y-magnet is pulsed, limiting the travel to a single step at a time.





SECOND-last step—addition of the X-Carriage and the Y-Carriage, and the wiper blades which make contact with the wire banks. The Y-carriage is mounted on the X-carriage and travels with it in the X direction. Gears locked on the cog roller assembly engage the rack on the Y-carriage, advancing the Tip, Ring, Sleeve and Hunt Sleeve wipers into the wire bank. The X-XX wipers, mounted on their own carriage, move into the X-XX banks as the switch moves into the X direction. The switch uses twin nickel silver wipers with the wiping surfaces under sufficient pressure for positive contact with the smooth round vertical wires of the wire bank. The usual replacement because of wear is eliminated.



AND here's the completed switch, ready for immediate plugging in to any shelf for use as Line Finder, Selector or Connector. Among the additional components are the Z or Release Magnet, which releases the two retaining pawls upon release of the switch train, allowing the Y-Return Spring to return the Y-Carriage to its home position. After this the two carriages return home in the X direction. The wiring and cabling is terminated in a 36-point plug.

STROMBERG-CARLSON transmitter

Selling Convenience Systems

By A. B. PREBLE, Manager
Stromberg-Carlson Kansas City Office

"WHAT is our experience in selling Stromberg-Carlson 2-10 P.B.X. systems?"

L. P. Schlentz, general sales supervisor of The Lincoln (Nebr.) Telephone and Telegraph Company, repeated the question put to him by the writer.

"Well, I would say that they pretty much sell themselves," he continued answering the question. "They are by far the most popular unit of this size that we have in service—as a matter of fact they outsell other comparable units more than five to one."

Schlentz went on to say that the L. T. & T. Company had 306 P.B.X. systems in service. Of these, 104 are Stromberg-Carlson 2-10. In the small user class the Company has 123 P.B.X. units of which all but 19 are Stromberg-Carlson 2-10. Compared with total stations in service, LT&T has an average of one Stromberg-Carlson 2-10 unit for every 1,000 telephones it operates.

"Monthly revenue received from rental of this equipment amounts to $5,756 or an average of $55.35 per unit," Schlentz said, adding that he considered this to be a very satisfactory return.

3-9 system in Cook Paint and Varnish Co. Pictured l. to r. are Bedric Wanek and Howard Spahnle, of the Lincoln phone company, M. L. Cole, the paint company's assistant manager, and Cook salespeople Marilyn Bush and K. T. Johnson.

Ideal for Small Businesses

Howard Spahnle, district sales manager at Lincoln, echoed these thoughts.

"They are easy to sell," he said, "because they are so well suited to the needs of small users, of which we have a comparatively large number in Lincoln."

Insurance agencies, attorneys, physicians, banks, automobile companies, wholesalers, manufacturers, small department stores, government offices, farm equipment dealers and radio stations were cited by Spahnle as the best prospects among the 46 types of businesses the Company now serves with this kind of P.B.X.

Service Engineers Alex Geist and Bedric Wanek in the Lincoln sales department noted that only one of the 61 Stromberg-Carlson 2-10 systems they had sold in Lincoln had been removed or changed to a different type. In that one case the customer's business had grown to the point where a switchboard and operator were required.

Selling Technique

Geist and Wanek follow a sales approach which has brought excellent results. Prospect lists are first prepared. The customer is then called upon. He is shown a 2-10 instrument and given a detailed explanation and demonstration of how the system operates. Recommendation as to the number of trunks and stations required together with cost figures are given the customer. He is then presented with a typewritten sheet which covers the points that have been discussed.

Advantages of operation listed on these sheets are:

1. A compact and attractive telephone is the only equipment needed at each desk, doing away with a clutter of keys, buttons, and buzzers.
2. Calls can be answered and transferred from any location.
3. Each telephone has a complete signaling arrangement to every other telephone.
4. A common talk service is provided for all telephones without interfering with any outside connections.
5. All trunk connections are strictly private. No one can cut in on conversation from another telephone, unless so desired, and this is done with the flip of a key.
6. All trunk calls can be held while transferring without danger of a disconnect.
7. Operation of the system is swift, simple and positive.
8. The 2-10 P.B.X. system is an unattended type and does not require a special operator. The simplicity and speed of operation requires less time than ordinary key and push button and buzzer arrangement.

2-10 system installed at Lincoln Bonding and Insurance Co. L. to r.: Edwin Dosek, the firm's secretary-treasurer, Alex Geist and A. B. Waters of Lincoln Telephone and Telegraph Co., and Donna Bridger, receptionist.

Plant Men's Praise

Plant department men like the Stromberg-Carlson 2-10 also.

Max Walker, district plant manager at Lincoln, reports that the maintenance cost of this equipment is low and that the equipment is easily accessible when repairs or replacements are necessary.

George Brock, area manager at Wilbur, Nebraska, was especially sold on 2-10 units.

"That Stromberg-Carlson equipment can really take it," he said in relating an incident that occurred during a flash flood at DeWitt two years ago. During the flood a Stromberg-Carlson 2-10 relay cabinet was completely submerged for 10 hours in the basement of a wrench manufacturing company. "After the water went down and the basement was pumped out, we dried out the relays and form wiring in the cabinet with electric fans and heaters," Brock said. "Silt was brushed out and a few adjustments were made and the system has been working like a charm ever since."

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Plan Now To Attend Your Association's Annual Convention

Plan Now To Attend Your Association's Annual Convention

THE BACK OF THE BOOK

By JOHN G. REYNOLDS, Managing Editor

There's Sobering Thought Here . . .

ACCORDING to a study made by a University of Wisconsin psychology class, if you live to be 70 you will have spent one year on the telephone, about 20 years sleeping, two months signing pay checks for 20 solid years of work done, five years on shaving and dressing, five months doing nothing but tying shoes, 2½ years in bed, 2½ years smoking or doing other things that probably didn't help you any, seven years in sports and three years just plain waiting on something or somebody. Yes, we've added it up—and those psycho students just didn't say where you will have spent the rest of your time.

• • •

"Dear Bell Telephone"

THE POSTMAN brings telephone companies many letters and many of them can bring a warm feeling around the heart and a deep sense of satisfaction in the happy part telephone service plays in the lives of subscribers.

Such a letter was one recently received by Pennsylvania Bell . . . "Dear Bell Telephone," the lady wrote. "When I was making out my check to you, I suddenly realized that you were one of my oldest and best friends . . . I well remember when you first came into my house—it was years and years ago and you had to be cranked and an Operator asked for 'Number Please?' Then you became a desk telephone but you still had to be cranked, then the lifting of the receiver called the Operator and finally the dial system.

"What a good friend you have always been! When I was a child, you thrilled me with that ring, two long and one short. It was a playmate calling me or my mother calling me from downtown. As I grew up, your calls were of a different nature but nevertheless most welcome. Business calls, date calls, friendly calls—you took care of them all, Bell Telephone. You have had to give me sad news over the years but it was wonderful that you could also give me the cheerful and sympathetic calls that followed."

Such a letter, of course, calls for an appreciative answer. Here's what Brewster Rhoads, Jr., Public Office Manager—Northeast Philadelphia, said in part in reply:

"It is heartening," the letter said, "that you consider us one of your oldest and closest friends, for friendship is such a warm and comfortable feeling. . . . You have come a long way with us over the years and you shall see us continue to progress as we meet the demands of the future. You will help us in our venture too, by contributing your loyalty and friendly spirit."

• • •

Those Boring British Birds . . .

HERE, PERHAPS, is as good a place as any other to mention that the British post office, which also is in the telephone business, is equipping some telephone wires with "dampeners" to keep them from humming in the wind. The hoped-for result of this de-humming is to discourage birds, particularly woodpeckers, from eating holes in poles. Having had, as it were, a stomach full of pole holes, the British post office people came up with the thought that possibly the birds are attracted to the poles by hearing what they think is the humming of insects. Time will tell.

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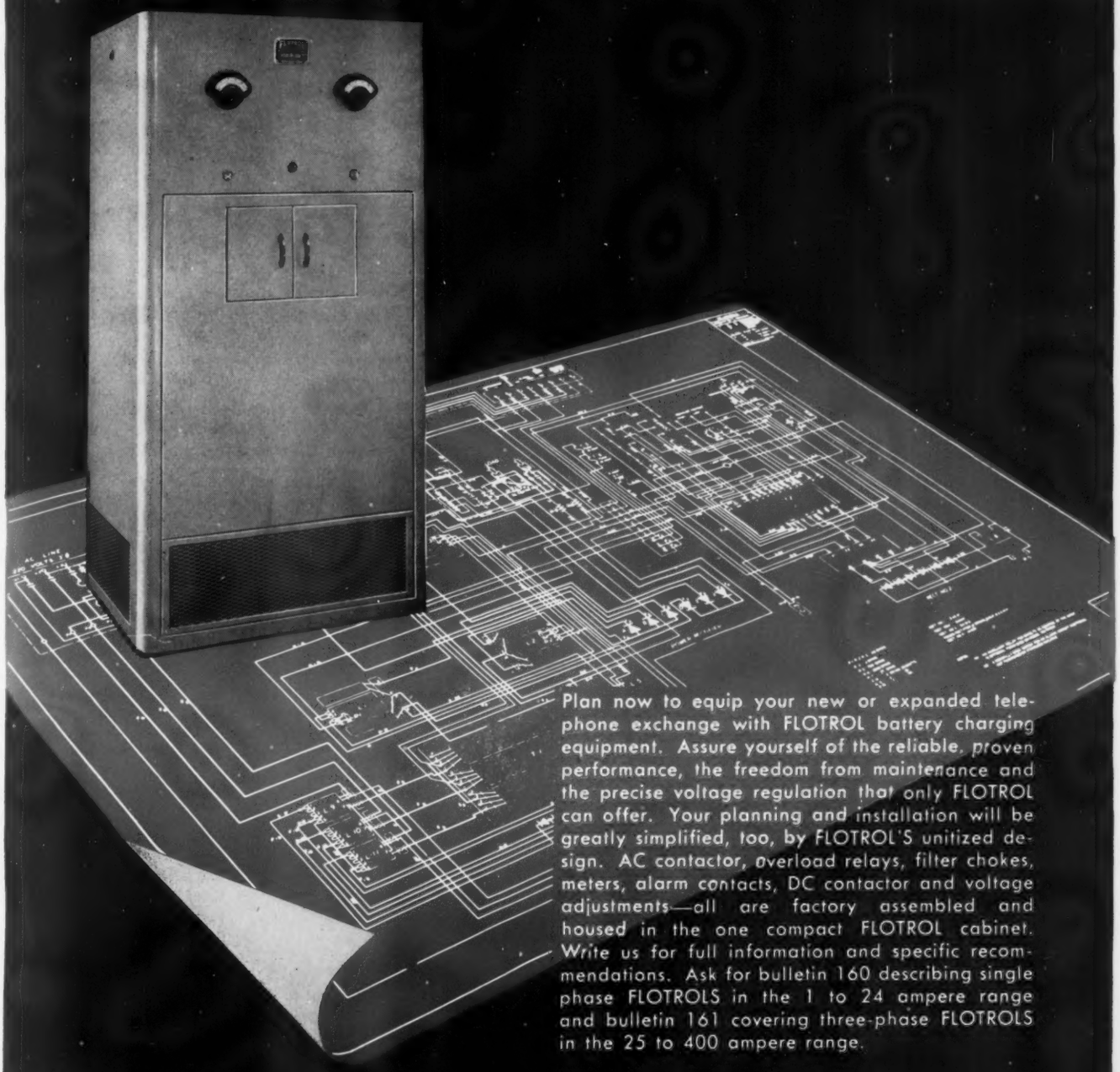
The Price Of Progress . . .

THE NORTHWESTERN Bell is helping the Jackson Cooperative Telephone Company, a rural service station group near Keokuk, Iowa, to rebuild their lines. The J.C.T. folks are doing a shipshape job—full metallic circuits, new telephones, fewer per line, etc. But there's a bit of wonderment in their ranks because they've learned their fancy new system probably isn't going to provide one of the side services they've come to expect from the old. Every once in a while they could lift the receiver and hear fetching messages broadcast by the Omaha police radio system. Sorta made up for some of the regular service they didn't get.

Well that's progress for you. It gives and it takes. Best a person can do is to try and pick their progress so it gives more than it takes.

BLUEPRINT
for better service



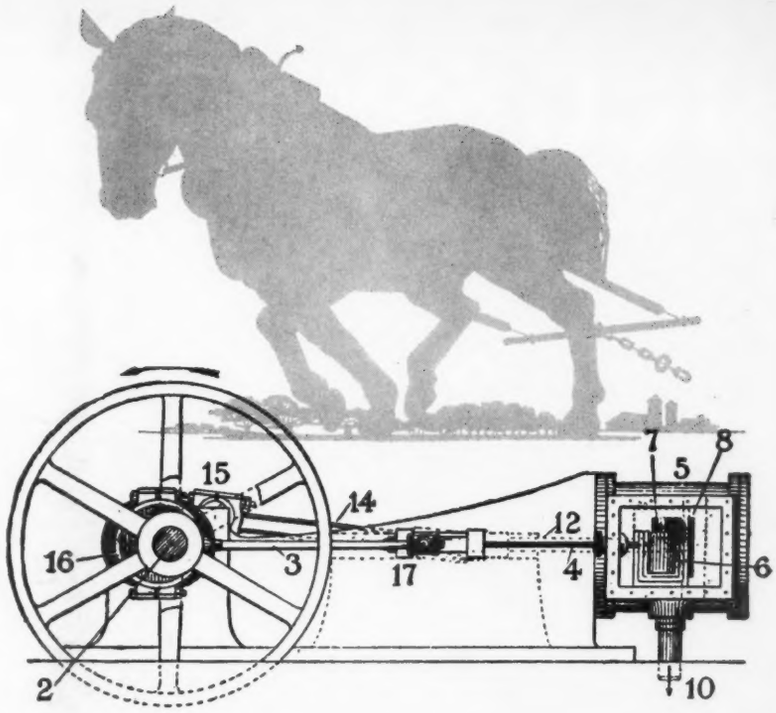
Plan now to equip your new or expanded telephone exchange with FLOTROL battery charging equipment. Assure yourself of the reliable, proven performance, the freedom from maintenance and the precise voltage regulation that only FLOTROL can offer. Your planning and installation will be greatly simplified, too, by FLOTROL'S unitized design. AC contactor, overload relays, filter chokes, meters, alarm contacts, DC contactor and voltage adjustments—all are factory assembled and housed in the one compact FLOTROL cabinet. Write us for full information and specific recommendations. Ask for bulletin 160 describing single phase FLOTROLS in the 1 to 24 ampere range and bulletin 161 covering three-phase FLOTROLS in the 25 to 400 ampere range.

FLOTROL
PARTNERS IN DEPENDABILITY
SUB-CYCLE

LORAIN PRODUCTS CORPORATION 1122 F ST. LORAIN, OHIO

In order to measure his progress in perfecting his steam engine, James Watt saw the need for the establishment of a Standard of Measurement. Inasmuch as his was an attempt to harness power, he compared the ability of his engine with that of the horse. He began to measure his engine's performance in terms of horse-power — and established that one horsepower is the energy required to lift 33,000 lbs. one foot in one minute.

Thus, horsepower was established by James Watt as a



Standard of Measurement

In nearly every field of specialized endeavor, there are standards of measurement against which performance is checked. However, there are a few notable exceptions to this rule. We find that few Independent Telephone Companies have ever applied a proven standard of measurement to their directories.

LET US ASK YOU JUST ONE QUESTION

Did you measure the results of your current directory by simply comparing it with your previous issue? Unfortunately, most telephone companies are still following such a procedure.

We publish directories that serve more than 4,000 Independent Telephone Exchanges. From our records we have been able to establish standards of measurement; such as, directory revenue per station, directory revenue per business account, directory revenue per advertiser and advertiser per one hundred business accounts.

These established measurements of results, when applied to your current directory, will show you whether your current directory job was good or bad, and whether or not we could do a better job for you by increasing your net directory profits.

Why don't you send us a copy of your current directory and let us make a study of it without any obligation whatsoever.

You have everything to gain and nothing to lose.

GENERAL **TELEPHONE DIRECTORY COMPANY**

Nation-wide Publishers of Telephone Directories

N. 108 Washington	1415 Avenue M	185 North Wabash Avenue	604 Pine Avenue
Spokane, Washington	Lubbock, Texas	Chicago, Illinois	Long Beach, California
Telephone MAdison 8644	Telephone 2-6330	Telephone STate 2-5478	Telephone 6-7221

Telephone collect or write to one of the offices listed above for a representative to contact you.